

Session 4

PLANTS AND SOCIETY

Talks

SOME PLANTS DRINKING AND THEIR RELIGIOUS AND SOCIAL MEANING IN SUDAN CASE STUDY: *HULU-MUR, ABREH AND SHERBOT*

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This paper will discuss the plants drinking as one of the indigenous fermented drinking of the Sudan, research will focus on three types of these drinking related with two religious and social ceremonies. *Hulu- Mur* and *Abreh* are drinking prepared from the sorghum for special occasion of *siam Ramandan* “month of fasting for muslims”, and *Serbot* prepared from date palm it also strongly linked to the religious occasion of the “*Eid- Kebir*” big barium when rams are slaughtered as a sacrifices. The methodology with focus on three aspects; the preparation and production process, microbiology and nutritional aspects for *Hulu-mur*, *Abreh* and *Sherbot*.

Key-words: Hulu-mur, Abreh, Sherbot, Sudan, Plants drinking.

WHEAT AND VINE, FLOUR AND WINE: CROP STORAGE AND PLANT FOOD PROCESSING AT THE IRON AGE IBERIAN SETTLEMENT OF ESTINCLELLS (VERDÚ, CATALONIA, SPAIN)

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The excavation of the Iberian settlement of Els Estinclells unveiled a single level of occupation ranging between 300 and 200 BC with a final layer linked to events associated with the Second Punic War. Layers revealing fires were in four of the houses probably due to looting after their abandonment. The sudden destruction and the systematic sampling of sediments led to the discovery of a series of compelling archaeobotanical assemblages linked to production and storage. The main crop at this site, both in terms of the number and ubiquity, is naked wheat. It is followed by hulled barley and vine. Hulled wheat and legumes, although poorly represented, are also present. Most of the remains are in two of the burned structures: House 9 and Building 15. The first had a semi-clean storage space while the second, in turn, housed a beam wine press with an in situ

base and vats. Finds of grape pips among the archaeobotanical analyses are nonetheless scarce, whereas remains of naked wheat, chaff and weeds are abundant.

These finds lead to the hypothesis that the building was polyvalent serving both as a wine press and a grain warehouse. Moreover, its potential volume of grain storage, as well as that of other silos at the site, suggests it played more than a domestic role. Furthermore, two other buildings reveal bases of Iberian rotatory pushing mills suggesting a centralised grinding of flour. The number of remains in these buildings, however, is very modest.

Key-words: Cereals, chaff, weeds, crops, wine, storage

PLANT USE AND RITES AT BURNT-OFFERING SITES IN INNER-ALPINE AREAS OF NORTHERN ITALY DURING THE BRONZE AND IRON AGE

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Burnt-offering sites were characteristic hot spots for the expression of the inner-alpine human living in a physical and spiritual way during Bronze and Iron Ages. The characteristic records and findings provide information about the society, its faith, skills, and economic behavior. In this study, we focused on the plant use and rites at 18 burnt-offering sites located in the inner-alpine areas of Northern Italy and adjacent regions during the Bronze and Iron Age. Wood was basis for the implementation of the rite and the transformation. It was collected adjacent to the offering site, whereby the selection of wood quality depended on the local availability. The remaining charred wood together with economic plants were ritually deposited in pits. Cremation and deposition rites reveal a deep spiritual connection to nature and an intentionally high appreciation for plants as raw materials and energy sources. The proved main crops were *Hordeum vulgare* (hulled barley), *Panicum miliaceum* (broomcorn millet), and *Vicia faba* (faba bean). They seemed to have a superior role in local food. Moreover, gathered plants like *Corylus avellana* (hazel), *Prunus spinosa* (sloe), and *Sambucus* (elder) were also offered and underline the importance of gathered food. The remaining observed wild plants reflect a more or less anthropogenically influenced environment, but some probably were also offered due to their edible, medicative, or symbolic background.

Key-words: Plant use, rite, burnt-offering sites, inner-alpine areas, Bronze and Iron Age

PLANTS FOR THE FINAL JOURNEY - ARCHAEOBOTANICAL EXPLORATION OF THE 18TH C. CHILDREN'S BURIALS IN THE HOLY TRINITY CHURCH (SANCTUARY OF THE DIVINE MOTHER QUEEN OF KRAJNA) IN BYSZEWO (POLAND)

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In the Holy Trinity church in Byszewo (Poland), numerous children's burials dating to the 1st half of 18th c. were discovered. Apart from human bones, relics of robes and metal objects, accumulation of botanical remains were recognized as well. Archaeobotanical analysis (seeds, fruits, flowers, pollen, woods) allowed to determine plants species and describe their role in the funeral rites in the past (task No 499 and 502; 530-L145-D581-19). Individual plants could play a symbolic role, provide food for the deceased on his journey to the afterlife or be a simple decoration. To fill the pillows on which deceased's head rested, plants such as *Humulus lupulus*, *Satureja hortensis* or *Artemisia* spp. were used. Interesting is that pollen, flowers and twigs of *Artemisia* appeared both in the fillings of pillows and coffins (mattress). Research confirmed that ornamental flowers *Tagetes* sp. were placed in graves, however an artificial equivalent of *Tagetes*, which was made of felt/silk, was recognized in some of the coffins. The analysis of the wood showed that the basic parts of the coffins were made of oak/pine and only pegs presented a greater taxonomical spread in the use of the raw material. The results obtained from the crypts of the church in Byszewo already constitute a valuable source of knowledge about the 18th c. funeral practices and have become a starting point for further discussion on the selection of plants depending on the wealth of the deceased or the season during which the funeral has been organized.

Key-words: archaeobotany, children's burials, funeral practices

FROM FARM TO PHARMACY: *LOLIUM TEMULENTUM* IN ROMAN AGRICULTURE AND MEDICINE

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In this paper I examine the mimic weed *Lolium temulentum*, darnel, in different social and cultural contexts in the Roman world. Darnel was a by-product of agriculture throughout antiquity. Its negative health effects made it a dangerous weed- consumption of darnel causes dizziness, nausea, and blindness. Coupled with the difficulty of removing it from the harvest due to its similarity to wheat, it was a particularly problematic form of agricultural waste.

I first discuss the prevalence of darnel in the archaeobotanical record in Italy from the Archaic Period forward, focusing on the contexts in which it is found and its frequency, including in unpublished data from the site of Gabii in Central Italy. I will compare this archaeological portrait to the one apparent from ancient literary sources. Darnel appears in a negative light in agronomic writings, like those of Pliny and Columella; it's also used as a sign of ill-omen in Roman poetry, showing that the conception of darnel as a dangerous weed had significant cultural penetrance. However, the cultural porosity between literature and agriculture existed in another genre: darnel was also a medical ingredient in Roman pharmaceutical texts. It has been assumed in modern scholarship that, as an ergotized weed, its medicinal value was hallucinogenic, and therefore for ritualized or religious medical contexts. However, no sources support this conjecture. By using its status as a poisonous weed to frame its medicinal applications, I argue for the impact of darnel's agricultural characteristics on its pharmaceutical ones. It is through a consideration of its role in daily life, accessible through paleoethnobotany as well as text, that it is possible to understand darnel's use in the ancient world.

Key-words: medicine; crop processing; weeds

CEREMONIAL MAIZE OF THE SOUTH-CENTRAL ANDES: A PICTURE OF VARIABILITY AND PROCESSING AT INKA EXPANSION TIMES ON THE BASE OF CHARRED MACROREMAINS

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The goal of this presentation is to understand commensality of public ceremonies in south-Central Andes immediately before and after the Inka conquest through the characterization of the maize involved. Most of the knowledge about ancient maize of this region comes from dairy life middens and domestic areas. In contrast, ritual contexts were rarely studied. Circa of one thousand of charred corn macroremains (kernels and cobs) recovered from two ceremonial platforms are analyzed. They belong to Los Amarillos and to El Shincal de Quimivil archaeological sites (NW Argentina). The former presented its maximum occupation during the Regional Development Period, drastically disrupted since the Inka conquest. The latter was an Inka Administrative/Ceremonial Center resembling a little Cuzco. Morphometric (i.e. shape and dimensions; endosperm types, pericarp aspect) and experimental variables (i.e. shrinkage, expansion, endosperm extrusion, pericarp changes) were registered in order to recognize different maize types and processing techniques (i.e. pounding, boiling, toasted) as well as charring conditions. Main results show a great maize intra-specific variability and diverse culinary preparations in both sites which can be related with offerings coming from different local communities; continuity in the use of local landraces through time; but differences in plant parts recovered and practices involved. Symbolism, empowering and believes of local cosmovisions are discussed.

Key-words: archaeobotany, maize, Inka conquest, ceremonial context, South-Central Andes

SLAVES OR ARTIANS? A MINER'S DIET IN THE SOUTHERN LEVANT

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In the western Arabah valley, copper mining focused in two main centers: the Timna valley during the Early Iron Age (11th-10th centuries BCE), and Nahal 'Amram during the Roman-Byzantine period (1st-5th centuries CE). These areas, located in the climatically extreme arid desert, were inhabited by several human populations. Plant remains from a variety of contexts (mines, workshops, and dwelling caves) in different sites of the Timna valley and Nahal A'mram, shed new light on the miners of the Arabah.

The archaeological assemblage from these sites includes textiles, animal and fish bones, and plant remains which preserved via desiccation. The plant remains represent all the major food categories: carbohydrates, proteins, fats, vitamins and minerals. Furthermore, each category is varied and includes several species. In addition, remains of fruits and vegetables that are not grown in the vicinity of these sites were found, possibly served as luxury items.

These archaeobotanical assemblages attest to the socioeconomic level of local miners and copper

smiths. Despite our initial conception, their food pyramid does not have characteristics of slave's diet. All food groups are well- represented, including several species which must have been imported from afar. In light of the archaeobotanical evidence for socioeconomic status, we propose a re-identification of the Arabah copper slaves as skilled artisans.

Key-words: Copper, Mines, Food, Timna

ON THE SIGNIFANCE OF OLIVE ARBORICULTURE IN THE EARLY BRONZE AGE LEVANT

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The Early Bronze Age Levantine sites of Tell Fadous-Kafarbida (Lebanon) and Zeraqon (Jordan) show evidence for intensive olive arboriculture as found by high fragment percentages of olive charcoal as well as high percentages of olive stones and other indications for olive oil production. Within this presentation, the two sites will be placed in a regional perspective; demonstrating the sites match the general picture of intensive olive cultivation in the Levantine region during the Early Bronze Age.

Key-words: olive, Levant, charcoal, olive oil production, Early Bronze Age

‘FARMING THE CITY’: AGRICULTURE AND STORAGE IN THE BRONZE AGE

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The growth and development of large urban societies in Western Asia (c.2500-1200 BC) saw the emergence of many new forms of social behaviour including the establishment of large-scale sustainable agricultural systems. These systems would have utilized resources from the taxation of domestic producers as well as state-run estates to ensure food for daily consumption as well as a storable surplus for periods of instability. Archaeological research into the establishment of these agricultural systems, however, has been restricted due to the lack of direct archaeobotanical evidence recovered from primary contexts (e.g. storage) in these early cities. Instead, scholars have tended to rely mainly on documentary evidence, which provides a biased and partial picture at best.

This paper will seek to address this issue by presenting archaeobotanical results from the Bronze Age cities of Tell Brak in north-east Syria and the Hittite capital of Hattusha in Central Anatolia. At both sites, very large, intact charred cereal stores have been discovered providing a unique snapshot into the harvest of each city. This material has been interpreted through the use of crop

stable isotope analysis and functional weed ecology as a means of inferring crop husbandry conditions and agricultural practices. This work sheds light on the wider nature of Bronze Age farming and provides a link between the rural environment and the urban landscape of the city.

Key-words: Bronze Age urban agriculture, stable isotope analysis, functional weed ecology

THE LATE IRON AGE PERSISTENCE OF PEARL MILLET IN THE INNER CONGO BASIN (ICB): BEER OR FOOD – WAS MILLET EVER A STAPLE IN THE AFRICAN LOWLAND RAINFOREST?

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Today exotics, New World crops and plantains, constitute the dominant starch staples in the Inner Congo Basin rainforests. However, the advent of ICB rainforest agriculture was characterized by African savanna crops, pearl millet and pulses, introduced from outside during the late first millennium BC. Today, their cultivation is mainly restricted to areas with a pronounced dry season. We thus assumed initially, that rainforest pearl millet cultivation was an interlude only, linked to a period with distinctly seasonal climate.

We have new evidence that pearl millet was still present in the ICB rainforests much later, at least until the arrival of the New World crops. Cultivation experiments at a low latitude ICB site were successful, proving that pearl millet also thrives under the current all-year round humid climate. Storage is yet connected with high risk of loss due to fungal decay.

Significant questions arise from the ICB persistence of pearl millet: What was its role for rainforest subsistence, was it ever a staple crop, and why was it eventually abandoned?

The better-adapted and high yield New World crops finally outcompeted the savanna species *Pennisetum glaucum*. Even before, it was certainly not the main staple in the area. The adherence to pearl millet in an environment marginal for its cultivation indicates that it rather represented a valued cultural heritage. In this context, we discuss modifications of charred caryopses possibly pointing to millet beer production.

Key-words: Pearl millet, New World crops, rainforest subsistence, staple, beer

INFERRING PLANT-RELATED ACTIVITIES AND FOOD PLANT PROCESSING AT AN EARLY NEOLITHIC SETTLEMENT IN CENTRAL ANATOLIA, AŞIKLI HÖYÜK

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Agriculture is a pivotal transition in the history of humanity, profoundly affecting the lives of communities in many aspects. This paper investigates the process of the adoption of agriculture at the formative site of Aşıklı Höyük (8400-7300 cal BC), Central Anatolia-Turkey, by focusing on plant-based activities.

Throughout its long, uninterrupted occupation the inhabitants at Aşıklı transitioned from a mobile to a sedentary way of living, increasingly engaging in animal management and agricultural production. This paper discusses recent archaeobotanical results, which reveal Aşıklı inhabitants' various behaviors by focusing on food plant preparation, processing, and consumption throughout the 9th millennium BC occupation. It also explores the collective aspects of plant-related activities within the settlement. The methodology involves comparing similarities and differences among macrobotanical assemblages from different buildings and external spaces. Buildings with communal and/or special uses as well as those that represent houses will also be reconsidered on the basis of their plant assemblages. Consequently, the paper provides insights into the socio-cultural life of the Aşıklı community, which is crucial for assessing the adoption of an agricultural way of life both in local and regional contexts.

Key-words: Food plant processing, plant use, early Neolithic, Central Anatolia, Aşıklı Höyük

FOOD PRODUCTION IN THE BRONZE AGE DANUBE RIVER REGION: THE CASE OF KAKUCS-TURJÁN, HUNGARY

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The Bronze Age in the Hungarian Danube River region is characterised by various transformations in settlement patterns, including the reappearance of (fortified) tells and the emergence of centralised settlement structure. Cultural groups (distinguished on the basis of specific ceramic styles) characterising the beginning of the period were replaced by succeeding groups through the Middle Bronze Age. The fortified settlement of Kakucs-Turján mögött (Hungary) is a multi-layered settlement that was occupied for nearly 1000 years, spanning the entire Early and Middle Bronze Age. The excavations uncovered several phases of activity and habitation, including two successive household structures of an MBA Vatyá group and remnants of a preceding EBA Nagyrév group. The analysis of nearly 500 samples containing carbonised botanical remains has revealed that the plant-food economy was founded on a wide variety of cultivars. Contextual and stratigraphic analysis of the remains allows for a reconstruction of (i) spatial and temporal distribution of plant-related activities, and (ii) dis/continuity of plant husbandry practices at the site. Seen from the perspective of individual households, this study seeks to synthesise archaeobotanical and archaeological evidence of change. It thereby aims to contribute to the understanding of the role of plant-food production within the major socio-cultural transitions taking place in the region during the Bronze Age.

Key-words: food production, crop cultivation and processing, household, Bronze Age, Hungary

THE ARCHAEOBOTANICAL CONNECTION BETWEEN HERA AND THE PHILISTINES: IRON AGE SAMOS AND TELL ES-SAFI/GATH

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Despite the difficulty of reconstructing ancient peoples' faith from archaeological finds, plant remains from cultic contexts can contribute important data to the archaeology of religion. Here, we present new data on ritual plant use in Tell es-Safi/Gath, Israel, connecting Philistines with the Aegean cult of Hera. These plants were discovered in two successive early Iron Age Philistine temples, dated to the tenth and ninth centuries BCE, respectively.

The assemblages include sweet fruits and wild plants with relatively large and bright-coloured flowers, including Chrysanthemum (*Chrysanthemum coronaria*), and the first significant finding of lilac chaste tree (*Vitex agnus-castus*) fruits. This is the earliest evidence for the association of these widespread and ethnobotanically well-known Mediterranean plants with a cultic context. Notably, this Philistine cultic plant assemblage resembles garland offerings used in the cult of Hera at Samos island (seventh century BCE). In addition, chaste tree fruits are described among the cargo of the Ulu-Burun ship, associated with Late Bronze Age circum-Mediterranean trade.

We propose a relationship between Philistine ritual and the modalities associated with Hera – the goddess of married women and symbol of seasonality. The new archaeobotanical finds thus suggest a link between the Philistine cult and the Aegean goddess of the first Olympian generation, which cult goes back to the Mycenaean culture of the Late Bronze Age.

Key-words: ritual plants; 9th century BCE; Philistines Temple; Hera's wreath; Vitex agnus-castus

COMMUNITY IDENTITY AND CULINARY TRADITIONS-FOODWAYS IN THE WESTERN GREAT LAKES, NORTH AMERICA

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This paper uses culinary traditions and foodways to examine substantial changes in community creation and identity among the indigenous people occupying the western Great Lakes (North America) region from circa 100 BC to AD 400. The selection, preparation, and consumption of food serves to constitute and distinguish individuals as members of a cultural group, and, as an integral part of the cultural fabric, is sensitive to changes in traditional practices. Culinary traditions and foodways encompass multiple aspects of commensal behavior that are archaeologically accessible through multiple lines of material evidence. Implementing a multi-proxy approach, this study integrates traditional plant macrobotanical studies, faunal analyses, ceramic morphological and use wear analyses, and absorbed chemical residue analyses to provide a comprehensive overview of the intersection between food and culture in this region of North America. The Finch site, an open air Early to Middle Woodland (ca 100 BC to AD 400) era pre-contact American Indian habitation site located in the western Great Lakes region provides a case study for examining changing culinary traditions and foodways at the community level. The rich data set resulting from the complementary nature of these diverse methods reveals a wealth of data about the ways consumption practices create and maintain communities, underscoring the potential application of such an analytic suite to comparable archaeological contexts worldwide.

Key-words: Culinary traditions and foodways, Western Great Lakes (North America), Early Woodland, Middle Woodland, Havana/Hopewell

ONE MAN'S LEFTOVERS IS ANOTHER MAN'S FEAST: INTERDISCIPLINARY ANALYSES ON THE MATERIAL FROM A ROMAN VOTIVE PIT IN TERRACE HOUSE 2, EPHEBUS, TURKEY

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In 2004, excavations in Dwelling Unit 5 (WE5) of Terrace House 2 (HH2) in Ephesus unearthed a large flat pit beneath room 12a, partially dug into the bedrock. The pit had been filled in the mid-1st c. CE and was later sealed by a mosaic floor. Its filling lacks stratification and, together with the narrow temporal range of the ceramics found therein, points towards deposition within a short period of time. Pottery finds are dominated by high quality tableware. Among the other ceramic finds, a cooking tripod shall be highlighted, as shall amphorae for wine, olive oil and fish products originating from at least four regions of the Roman Empire. The animal remains derive from a huge variety of organisms, but are mostly dominated by pig, cattle, and various fish and mollusk species. Few bones show burning traces. The botanical spectrum, mostly charred material, is to a large extent characterized by fruit and nuts such as grape, olive, pine nut, fig, hazel, pear, and Cornelian cherry. Cleaned as well as processed cereals were found, as were large amounts of mineralized fig seeds. Vegetative remains from kermes oak, rock-rose, pine and heather constituted another large group of charred plant macroremains. Charcoal analysis did not show any clear hints on fuelwood selection. In the presentation, the whole find assemblage is discussed as probably originating from a private feast – maybe connected to construction activities – involving sacrificial aspects such as libations and burnt offerings, the remainders of which were deliberately deposited.

Key-words: Eastern Aegean coast, Roman Imperial period, feasting, domestic offerings, food spectra

THE CONTRIBUTION OF THE GRANARIES OF PRE-HISPANIC GRAN CANARIA (SPAIN, 500-1500 AD) TO THE STUDY OF PAST METHODS OF PLANT FOOD STORAGE

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Long-term strategies of food storage are key to cope with seasonal and annual shortages. They allow populations access to food for longer periods after the harvest and minimise the risks of famines provoked by unpredictable environmental fluctuations. This type of storage requires knowledge of different techniques to control temperature, humidity, and quantity of oxygen, as well as means of protection from insects and other pests. Moreover, although granaries and storage containers are not uncommon in archaeological contexts, identifying plant storage methods and techniques is generally complicated due to poor content preservation.

The study of granaries dating to the Pre-Hispanic period (ca. 500-1500 AD) in Gran Canaria, an island of the Canarian archipelago, offers new and unique insight into former methods for long-term food plant storage. The island's indigenous populations were farmers that cultivated most of their foodstuffs and built many granaries whose respective silos offer excellent conditions of preservation for organic materials. In certain cases they still preserve desiccated archaeological remains of crops as well as other plants such as leaves, wood and cordages. They also contain insect pests. This study therefore aims to identify both the plants stored in the granaries of Gran Canaria as well as their insect pests, and attempt to evaluate the past storage methods from data gleaned from the fields of archaeobotany and archaeoentomology.

Key-words: Canary Islands, Pre-hispanic, Storage, Plants remains, Insect pests

THE COMMON AND THE RARE: AN OVERVIEW OF EARLY MODERN DUTCH FOOD CONSUMPTION BASED ON ARCHAEOBOTANICAL CESSPIT DATA

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Past food consumption has been studied diachronically and spatially for many Dutch settlements. However, research into the food consumption by Early Modern Dutch inhabitants of urban settlements is somewhat underrepresented in the scientific archaeobotanical literature. To fill this knowledge-gap, archaeobotanical data from the Dutch Relational Archaeobotanical Database was analysed. This overview of Early Modern urban food consumption is based on cesspit-records which date between 1500 and 1850. First, the edible plant taxa were distinguished from medicinal plants and potentially edible weeds. Subsequently they were quantified to form an overview of plant taxa consumed per urban settlement. The resulting overview provides an insight into regional and time related changes in plant-food availability and preferences. All in all, the archaeobotanical data consisting of cesspit material from 51 cities yielded a list of 97 edible plant taxa. Interestingly, 20 taxa are continuously present in 50-100% of all settlements in the 350 years under study. The overall food consumption of Early Modern Dutch city inhabitants did not seem to change that much over time.

PROCESSING GRAIN AND APPLES AT THE EARLY NEOLITHIC SWIFTERBANT SITES IN THE NETHERLANDS

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The Swifterbant culture is a Late Mesolithic and Early Neolithic group of which remains are found in the Dutch wetlands, and are dated between 6000–3400 cal BC. The archaeological sites are as a rule embedded in Holocene sediments, and usually located on the levees in a creek landscape in the central part of the country or on the river dunes in the Rhine-Meuse delta in the western part of the country. Thanks to the wetland environment in which the sites have been preserved, there is

detailed knowledge of many aspects of the Swifterbant occupation. Well-preserved and finely stratified refuse deposits allow to define incorporation of ceramics (from c. 5000 cal BC), domestic animals (from c. 4700 cal BC) and cereals (from c. 4300 cal BC).

The remains of food processing and consumption are well detected on some of the Swifterbant sites –particularly on two recently excavated sites - Tiel Medel De Roeskamp and Nieuwegein het Klooster - and those will make a main objective of this contribution.

Cooking food left several types of organic fingerprints in ceramic vessels, which were detected as organic residues encrusted on sherds. These food crusts provide an optimal source of information about how people prepared their everyday meals, what foods were cooked and (in the most ideal cases) what pots were used for what kind of foods. In addition to food crusts, isolated finds of processed cereal food suggest that bread-like food might have been also prepared at Swifterbant sites. In addition to cereal meals, various wild plants were collected and some were processed for later use.

A FRAGRANT GRAVE – THE WELL-PRESERVED PLANTS OF A MUMMIFIED 17TH CENTURY BISHOP

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When the coffin of bishop Peder Winstrup was to be removed from the crypt of Lund Cathedral, it was discovered how amazingly well the body was preserved. Despite the time elapsed since his death in 1679, skin, hair and clothes were perfectly preserved. It also turned out that the body rested on a rich plant material, stuffed in two pillows and a mattress and lining the bottom of the coffin. This material has now been examined and provides interesting insights into the use of plants in a high-status Christian burial. Indirectly, it also let us glimpse a 17th century garden, probably Winstrup's own. The date of death was December 7 and the plants available would have been those that were kept dried and stored in the household. For the burial they have chosen aromatic herbs, like hops, lavender, lemon balm, hyssop, dwarf everlast, absinthium and southernwood, to add a pleasant smell to the funeral or to disguise the stench of the dead body. Some of the species also have preservative, antiseptic or insect-repelling properties and may have contributed to the preservation. In addition, there were symbolic meanings. For instance, one of the pillows was stuffed with hop catkins. For the living, hops placed in pillows were supposed to induce good sleep. In this case it may have intended to guarantee the bishop a deep sleep after death, and perhaps to stop him haunting those he left behind.

Key-words: Burial rituals, aromatic herbs, mummy, garden

EARLY ROMAN ROYAL GARDENS: AN ARCHAEOBOTANICAL COMPARISON BETWEEN EAST AND WEST MEDITERRANEAN GARDENS

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Herod the Great (74/73-4 BCE), the Roman client king of Judea, is known as the most important builder in ancient Jewish history, and a patron of a number of colossal building projects throughout

his realm and abroad. Archaeological excavations have revealed the presence of gardens in Herod's palaces and monumental buildings; however, as is often the case, the plants of these royal gardens remain an enigma. I applied the technique of pollen extraction from plaster in several of Herod's gardens. In order to complete the picture, pollen has also been collected from contexts other than plaster (e.g. planting pots, garden soils); charcoal remains have been identified as well in cases that they were present. The charcoal spectrum features great resemblance to the pollen assemblage. A palynological investigation has also been conducted at the garden of Villa Arianna – Stabiae. In general, the identified pollen and charcoal remains from the eastern Mediterranean gardens show some similarity to other Roman gardens, indicating that Herod was displaying plants popular in the Western Roman Empire. So far, the eastern assemblages include local trees such as cypress, pine, olive and palm, but also hazelnut, a non-local tree; and widely-popular ornamental plants like laurel, myrtle and rose. This investigation provides archaeobotanical techniques of how to explore garden's vegetation in various archaeological contexts. The study also has the potential to shed light on questions such as the use of plants as a status symbol, elite behavior, importation of plants for royal display, and planting and horticultural techniques.

THE DAWN OF URBANISATION IN EUROPE: MOBILISING THE RECOURSES OF THE MARGINAL LANDSCAPES OF THE AEGEAN BRONZE AGE

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Prior to the inception of urbanisation in the Aegean on Crete after 2200BC, its antecedents may be recognised at a number of sites where a constellation of elements makes them stand out from their contemporaries. In recent years the most interesting of these sites is found on the small island of Keros in the Cyclades. In the period 2750-2300BC of the Aegean Bronze Age a number of factors combine in a unique foreshadowing of the processes of urbanisation. This paper will present the recent finds at the island of Keros focusing first on monumental architecture and metallurgy and will explore changes in agriculture, patterns of consumption and landscape exploitation related to increased centralisation. Undamaged by later occupation layers, we can examine the rise and demise of a third-millennium proto-urban centre, which stands out among its peers as what we expected to be the largest and most complex site within a now well-defined site hierarchy. The talk will present new evidence on agricultural regimes of the Early Bronze Age Cyclades, focus on grape and olive cultivation. The work undertaken at Keros for the first time provides a blue print for social change and economic organisation at the dawn of urbanisation of Europe.

POLLEN CONTENT OF A ROMAN MEDICAL REMEDY (POZZINO, ITALY, II C. BC)

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In 1989, numerous tin pyxies were found on the seabed of the Gulf of Baratti (Leghorn, Italy), in front of the Pozzino cove. The pyxies were at the depth of 18 meters, near the remains of a small hull dated to the II century BC. They were close to other objects, which presumably were part of

the professional equipment belonging to a physician travelling on the ship. One of the pyxies, which was hermetically sealed by the oxidation products of tin, contained six tablets, which presumably were a medical remedy. Chemical analysis revealed that inorganic components – mainly based on zinc hydroxy carbonate – constituted more than 80% of this tablet. The organic components were animal and plant lipids, beeswax, starch and resin. Pollen grains were present in large amounts. Most of the pollen grains belongs to *Olea*, but the long list of morphotypes suggests a multisource origin of the grains, in agreement with the presence of the above-mentioned ingredients. Many grains belong to plants that produce showy flowers commonly preferred by bees, confirming the identification of a bee-product as an ingredient of the tablet. As a whole, the plants listed in the pollen spectrum hint to the Eastern or North-Eastern Mediterranean basin as the area of origin of the medical remedy, in agreement with the archaeological hypothesis that the ship had been coming from the Greek coasts or islands, as indicated by the objects which constituted most of the cargo.

Key-words: archaeobotany, palynology, shipwreck, Olea

PLANTS-DERIVED REMAINS IN RITUAL CONTEXT IN QUBBET EL-HAWA, ASWAN, EGYPT

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Qubbet el-Hawa in Aswan, Egypt, is the necropolis where the governors of the city of Elephantine were buried. University of Jaen has been working there for ten years, excavating the tombs from Middle Kingdom. The excellent preservation of the remains as well as the systematic recovering of samples have provided a large number of carpological material. At the same time, the high quality of that material has allowed us to document unique findings such as the germinated seeds of *Hordeum vulgare* found inside a *Ptah-Sokar-Osiris*, in the main tomb of the necropolis. We present here the preliminary results of the carpological study that shows the corpus of plants used in funeral rituals at the South of the Nile Valley.

Key-words: Carpology, Egypt, Middle Kingdom, Ritual Context, Germinated seeds

THEY ALL SMELL THE SAME (THOUGH...) BUT THEIR CONTENT MAY BE DIFFERENT: LOOKING AT LATE MEDIEVAL HUMAN EXCREMENTS AND GARBAGE PITS IN THE COUNTY OF HAINAUT, SOUTHERN LOW COUNTRIES

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Human excrements and garbage pits of two archaeological sites in the County of Hainaut (Southern Low Countries, Belgium) have been studied by the interdisciplinary team “Archaeosciences” of the RBINS. Stone walled latrines dating from the 14th century have been uncovered

at the site of Chièvres, while several garbage pits dating from the 12th to the 16th century were excavated at the site of “rue des Bouchers-Saint Jacques” in the city of Tournai. We are presenting the 14th century composition of the waste contexts for the two sites and a diachronic composition’s evolution for the garbage pits of “rue des Bouchers-Saint Jacques”.

Archaeobotanical (seeds and fruit, wood and wood charcoal, pollen, spores and NPPs) and archaeozoological studies show that, in the majority, they contain digested food residues, food scraps and also some scarce remains of other non-food residues. The most common taxa found are vegetables, condiments, wild and/or cultivated fruits, cereals, fish and mammal remains. But if we look more closely, some cesspits contain outstanding elements such as honey (the first mention in Wallonia for the medieval period), waste of cereal processing that may have been used for the sanitation of such structures.

This paper aims at:

- 1 / highlighting late Medieval period human food intake of the Southern Low Countries
- 2 / comparing data between two 14th century waste contexts and finally,
- 3 / showing differences in pit fillings, indicating different structure maintenance and/or different social status.

Key-words: Southern Low Countries, latrines, late Middle Ages, human diet, honey, sanitation

IS THE STORAGE RUNNING OUT? NEW APPROACHES ON THE SECURITY OF SUPPLY FROM THE 6TH CENTURY GRANARY OF THE EARLY BYZANTINE CITY CARIČIN GRAD (SERBIA)

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The early byzantine city of Caričin Grad was built in the first quarter of the 6th century on an unoccupied hill in the Leskovac-basin in southern Serbia. In the 6th century, a time marked by natural disasters, epidemics, war and conflicts, in particular the Balkans suffered from barbarian invasions. In this situation an organized storage and supply system was of great importance to secure the supply of the population and the soldiers on the frontier. In this system the *horrea*, granaries with large capacities, were an important key element. Also Caričin Grad, one of the new foundations within Emperor Justinian I. building program, was equipped with a large granary in the upper town on the north plateau. As storage activities in Caričin Grad were mostly known from private contexts, the building is in focus of archaeobotanical investigations since 2017, to shed new light on the public storage system and the role of the state within the supply of the city. The short time of use and destruction by a conflagration towards the end of the 6th century, as well as the already great amount of 150,000 identified crops, weeds and wild plants, provide an excellent basis to get insights into the storage of food and animal fodder as well as crop processing activities carried out inside the building. The ongoing research will yield important information to expand the knowledge on the development of storage and supply in unstable times of war and conflicts in the early byzantine Balkans.

Key-words: storage, granary, weeds, crops, byzantium

LESSONS FROM THE PAST; CONTEXTUALISING UNDERUTILISED CROPS, A CASE STUDY FROM THE MIDDLE NILE VALLEY

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Several crops that were important in northern Sudan during the mid-twentieth century have become minor crops in recent decades. Changes have been related to commercialisation, mechanisation and attitudes towards crops. This paper compares the advantages or disadvantages of the local crops versus newer cash crops. Whilst some of these ‘minor’ crops have less market value, they are more low-input and heat tolerant than the newer cash crops. These local crops also have a long history in the archaeological record further suggesting their environmental suitability. Farmer interviews were conducted as part an AHRC funded project ‘Subsistence and sustainability in a changing Sudan’ (2013-2016) which combined ethnographic information with archaeological datasets. As part of a GCRF AHRC project ‘Lessons from the past; Nubian agricultural knowledge and agricultural resilience, crop choices and endangered cultural heritage’ (2017 – 2018) a book was co-produced with local communities to document and preserve this endangered local knowledge for future generations. Fieldwork during early 2019 is further exploring the impact of agricultural development on natural capital within traditional agroecosystems, including about useful wild plants. This paper will also discuss more broadly how ethnobotanical and archaeobotanical approaches can highlight the potential future role of increasingly little-used cereals and pulses, and the importance of local knowledge to future agricultural resilience.

Key-words: Traditional ecological knowledge, food security, ethnobotany

FORTIFIED STORAGE AREAS IN THE LATE IRON AGE IN NW IBERIA: EVIDENCE FOR SURPLUS PRODUCTION AND CONTROLLED REDISTRIBUTION?

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Storage is a need common to hunter-gatherers and agricultural communities. Besides the primary requirement to keep, unspoiled, the necessary food to feed a group of people in multiple time-spans, in some societies storage became a relevant issue in the social organization and even in the display of power among different individuals or groups acting on the community or regional level. These practices are seldom identified archaeologically.

Archaeological interventions in the Sabor valley (Northeast Portugal) due to the construction of a dam system, led to the largest archaeobotanical investigation ever carried out in Portugal. In the Iron Age sites of Quinta de Crestelos (Mogadouro) and Castelinho (Torre de Moncorvo) concentrations of storage facilities – *horrea* – were identified. These were used to store mostly clean grains of naked wheat, millet and barley but grapes have also been found regularly. At Castelinho, *horrea* were protected by massive defensive structures that incorporated abundant rock art and no relevant domestic structures were found within walls.

It is now clear that, on a wider regional perspective, these sites seem to reflect a period of change in which the concentration of storage facilities - pits, wattle and daub structures and *horrea* -

became common, making it necessary to assess the eventual capacity of Late Iron Age communities to produce surplus and the social implications of grain accumulation.

Key-words: Carpology, Late Iron Age, Northwest Iberia, Storage, Surplus

ADVANCES IN THE KNOWLEDGE OF ANCIENT BEER BREWING AND RECONSTRUCTION OF ITS TASTE

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Within the scope of ERC Project PLANTCULT we organized an international workshop “Ancient beer: multidisciplinary approaches for its identification in the archaeological record” at the University of Hohenheim in Stuttgart. At the IWGP, we want to present a summary and the results of the discussions during this workshop. Traditionally, malt finds in combination with special installations, features and finds indicating beer production and consumption are considered as hints/proof for ancient beer brewing (e.g. Bronze Age Archondiko Giannitson in Greece, Iron Age Eberdingen-Hochdorf in south-western Germany and Roquepertuse in France). Beer has been known as the drink of the big civilisations of the Near East, Sumerians and Egyptians, with many artefactual, pictorial and textual evidence confirming the widespread practice of beer making, both as a staple and a ritual drink. As we have seen both in Egypt (Predynastic Tell el-Farkha and Hierakonpolis as well as New Kingdom Amarna) and in Mesopotamia (Bronze Age Tall Bazi in Syria), we have to cross-check artefactual, pictorial and textual evidence with archaeobotanical macro- and micro-remains (e.g. Neolithic Can Sadurní Cave in Spain, Early Iron Age Heuneburg in Germany and Mont Lassois in France) to fully understand the production of ancient beer. Especially residue analysis of ceramic vessels is a line of evidence which methodology is still being developed and controversies often arise over the methods used for the detection of beer. Using the background of historical and craft beer brewing methods together with macro-remain and residue analyses as well as contextual information we can try to reconstruct past brewing processes and the taste of ancient beer.

Key-words: ancient beer, archaeobotanical macro-remains, archaeochemical residue analysis, Egyptian beer residues, experimental brewing, traditional brewing

TEXTUAL ARCHAEOBOTANY. WRITTEN AND ICONOGRAPHIC SOURCES FOR ARCHAEOBOTANICAL RESEARCH

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The plants used for therapeutic, alimentary, cosmetic and also veterinary purposes in Classical Antiquity have been described and studied by Theophrastus, Dioscoride, and Galen in the Greek World, and by Columella, Celsus, and Pliny in the Roman World. In several Byzantine manuscripts of Dioscorides' text many of these plants have been represented. All this textual and iconographic material has been the object of multiple scholarly studies. However significant and helpful it might be, particularly as a reference for archaeological and archaeobotanical research, this corpus has rarely, if at all, been approached in a comprehensive way thus far.

To compensate for this lacuna, ancient texts, plant representations, and the relevant scholarly and scientific literature (including reports of archaeobotanical excavations and laboratory analyses, together with identifications of plants according to modern botanical taxonomy) have been systematically collected and databased in a standardized format in relational tables allowing to virtually collect and retrieve all the available information on any plant attested in ancient texts or represented in Byzantine manuscripts according to changing parameters.

This presentation will describe the general elements of this major research programme and discuss specific case studies so as to illustrate how all this sum of material can be used to interpret the data resulting from archaeobotanical remains and analysis in the hopes that it will contribute to cross-disciplinary collaborations.

Key-words: literary sources, plant iconography, plants in medicine, ethnobotany, taxonomy

FOOD FOR THE AFTERLIFE? CONTRIBUTION OF THE ARCHAEOBOTANICAL EVIDENCE IN ROMAN CREMATION GRAVES TO BURIAL PRACTICES IN SWITZERLAND

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In the present study, all available archaeobotanical data from Roman cremation burials in Switzerland were compiled and evaluated. The aim was to shed light on the current state of research regarding funeral rites North of the Alps from an archaeobotanical perspective. The current database includes 580 cremation burials. Cross-site analyses based on multivariate statistics provided further information on various aspects of the cremation ritual. From these, it could be concluded that the local character of the choice of vegetable grave goods in the individual sites is striking. In addition, it is observed that cross-site evaluations cannot reveal any socially, age- and/or gender-specific differences in vegetable grave goods. The latter should be studied for each burial ground or location separately (site-specific).

Key-words: Roman, cremation, plant offerings, Switzerland, plant macro remains

FOOD AND TRADE AT ANCIENT KILWA, TANZANIA: ARCHAEOBOTANICAL AND HISTORICAL EVIDENCE FROM THE NINTH TO FIFTEENTH CENTURIES

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Medieval Swahili mercantile towns were connected to inland African communities and far-flung ports in the Indian Ocean sphere through vast trade networks. The ability to use trade partnerships and commercial routes for economic gain and political clout may have supported not only towns but perhaps city-states. The Swahili stonetown of Kilwa was a southern Tanzanian port famous for exchanging gold, possible all the way from Great Zimbabwe, and it may have been a regional centre of power, with influence over neighboring towns. Excavations by Chittick in the 1960s did not pursue wide botanical sampling, and only one store of sorghum was identified at the site. Recent excavations undertaken by Mark Horton as part of the Songo Mnara Project co-directed by Stephanie Wynne Jones and Jeff Fleisher have led to systematic sampling of a trench and a botanical record spanning the ninth to the fifteenth centuries (and possibly even more recent.) The analysis presented here focuses on staple crops, local vs exotic species, and culinary traditions evidenced by macrobotanicals at Kilwa Kisiwani and its neighboring site of Songo Mnara. In particular, I am interested in noting how botanical patterns reflect power relations between these two towns in the Kilwa archipelago.

EARLY BRONZE AGE PLANT ASSEMBLAGES FROM THE TEL ERANI SITE, ISRAEL

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Recent archaeological excavations at the archaeological site of Tel Erani in Israel included an exhaustive sampling to maximize the number of macroscopic plant remains, which indeed revealed very rich plant assemblages. This site is one of the most important Early Bronze Age settlements of southern Levant and one of the first sites with the presence of Egyptians. New excavations from 2018 revealed the remains of a gigantic defensive wall dated to a pre-Egyptian phase. Plant macro-remains were analysed from pre-Egyptian and Egyptian phases and were taken from various archaeological contexts. Among cultivated plants, remains of *Triticum dicoccon* Schrank. and *Hordeum vulgare* L. or *H. distichon* L. predominated. A high percentage of cereals were preserved as broken grains, which might suggest its use as food or some special remnants of grinding activities. Pulses were commonly found and, mainly consisted of *Lens culinaris* Medik. and *Vicia ervilia* (L.) Willd. Among fruit trees only *Olea europaea* L. occurred frequently, but also fruits of *Pistacia* sp. and *Vitis vinifera* L. appeared. Rich assemblages of wild herbaceous plants contained several species including grasses (mainly *Lolium* cf. *temulentum*).

Charcoal assemblages were dominated by *Olea europaea*. Other frequent taxa included *Pistacia* sp., *Prunus* sp., evergreen *Quercus* sp., and *Tamarix* sp. The preliminary results do not show any differences in the taxonomic lists of both cultivated and wild plants remains between two chronological phases at the site. This research was supported by the National Science Centre in Poland (grant number: UMO-2016/23/B/HS3/01886).

Key-words: cereals, pulses, wild plants, olive, anthracology, Early Bronze Age, Israel
