

LABORATORY OF ARCHAEOBOTANY AND PALAEOECOLOGY

Posters

OFFERS FOR THE GODS: ARCHAEOBOTANICAL REMAINS FROM THE BRONZE AGE CULT BUILDING OF PORTORUSSO (OTRANTO-LE)

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The fortified settlement of Portorussois located on the peninsula that stands between two bays along the Adriatic coast of Salento, south of Otranto (Le-Italy). The first excavation campaigns showed that during the Middle Bronze Age a violent fire destroyed a part of the village. This traumatic event caused the collapse and the abandonment of a covered building located near the fortification and used as a “cult place”. It is one of the rare examples in southern Italy of cultic building dating back to 1500-1300 BC.

The rituals performed inside the building were concentrated around six hearths, in which were placed various types of offers: small ceramic containers stacked or containing special objects such as pebbles, marine fossil elements, axes or axes in polished stone, bone pins.

As revealed by chemical analysis, some small pots contained drinks from fermented cereals, while others were used to preserve perfumed-oils made of conifer resin. The plants were fundamental elements of the rituals, the vegetal offerings include a great deal of cereal caryopsis, deposited in a small pit next to the supporting pole of the structure, but also acorns and other fruits, that had been laid near the hearths. It is possible that even the fuel used to fire the hearths had been intentionally selected among the species locally available.

Key-words: Plant offers, Bronze Age, cult building, Apulia

HUMAN-ENVIRONMENT INTERACTION IN THE BRONZE AGE PILE-DWELLING CAVE SETTLEMENT OF GROTTA DI PERTOSA (SOUTHERN ITALY)

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The cave of Grotta di Pertosa (Campania, southern Italy) housed a pile-dwelling settlement during the Middle and Late Bronze Age. A peculiar aspect of this archaeological site is the preservation of protohistoric uncharred plant remains thanks to anoxic underwater conditions. This study shows the result of the archaeobotanical analyses carried out on different types of plant macro remains: wooden artefacts, structural elements of the pile-dwelling and charcoals and seeds from soil samples. The study of the pile-dwelling structural elements and artefacts allowed us to understand both

the choices made in term of selection of raw material and the technological aspect of the carpentry work. The reuse of carpentry waste as fuel has also been taken into account, contributing to the identification of the wood species exploited in this area.

The study of the seeds found in the soil sample raised new questions, particularly regarding the exploitation of *Vitis vinifera*. Throughout the Italian Bronze Age the gathering of wild grapes was gradually replaced by a more or less organized cultivation: the selection, caring and harvesting of local wild vines played a major role during this course.

Using traditional biometric methods we were able to distinguish wild seeds (*Vitis vinifera* L. ssp. *sylvestris*) from the domestic ones (*Vitis vinifera* L. ssp. *sativa*), which in turn provide new information about the domestication of grape in Southern Italy. The date provide a base to trace the spread of viticulture in Italy and add new information about the process in the Mediterranean basin during the Bronze Age.

Keywords: South-eastern Italy, Pile-dwelling, Bronze Age, wood exploitation, Vitis vinifera, Human-environment interaction

HUMAN-ENVIRONMENT INTERACTION DURING THE PROTOHISTORY IN THE VALLO DI DIANO (SOUTHERN ITALY): NEW DATA FROM ARCHAEOBOTANICAL ANALYSES

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The Vallo di Diano is a large intermountain valley located in the southeastern Campania region (Southern Italy). During the Pleistocene the valley was a lake, which progressively dried out during the Holocene. In the late prehistory, the wetland area at the valley bottom certainly influenced the settlement pattern and the land use, pushing human groups to settle along the mountain slopes.

In this study, we use the archaeobotanical data (anthracological and carpological), obtained from recent investigations from two cave sites, Grotta di Pertosa and Grotta di Polla, to identify patterns in exploitation of vegetal resources during Protohistory.

The two caves show different geographical and climatic conditions and they were used for different purposes: Grotta di Pertosa was a pile-dwelling settlement, while Grotta di Polla was used as a burial site.

The study of these caves provide information on fuel procurement – in relation to functional and contextual aspects – and agricultural practices. In particular, the presence of *Vitis vinifera*, pips both in its wild and domestic form, characterizes the sample of Grotta di Pertosa as well as typical fruits of the woodland environment, while in Grotta di Polla the presence of cereals (*Hordeum vulgare* and *Triticum* spp.) is indicative of more open landscapes.

The results from our key study are compared with those from other sites from Vallo di Diano to attempt to identify changes brought by natural factors from those driven by the anthropic factors.

Key-words: South-Eastern Italy, Vallo di Diano, Protohistory, land use, wood exploitation; Human-environment interaction

STUDY OF PLANT MACRO-REMAINS FROM THE SITE BORGO TERRA (MURO LECCESE – LECCE - ITALY): GRANARIES STRUCTURES BETWEEN XV AND XVII CENTURY

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The Muro Leccese site, today Borgo Terra (Southern Puglia), is a context of particular importance because it is the only example of planned agro-towns which has been subjected to intensive archaeological excavations. The phenomenon of agro-town is well known and date back to the Late Medieval period, when the owners of the large estates found rural colonies to strength their control on their properties. There are numerous references to other models of new Italian and European foundations. Among the well known examples in literature it is sufficient to mention the new florentine *terre* or the french *bastides*.

Since the XIV century AD, several agro-towns are founded in the southern part of Apulia, following the abandonment of numerous rural villages and in conjunction with the threats of Turkish raids. The foundation of these new centers affected the landscape in a deep way.

The purpose of this investigation is to verify and detect any changes in farming and economy systems using plant remains preserved inside the granaries as indicators. The analysis focused on soil samples collected from some of the many granaries excavated in Borgo Terra. The soil samples (secondary filling) were carefully sampled during the archaeological excavation, and were successively floated and analysed. The plant remains under study are considered important indicators that can increase our understanding of the agricultural economy during the XIV century, the eating habits of the settlers and the natural environment around the site. In addition, the taphonomy of some remains allow to speculate about some aspects of storing techniques and crop processing.

Key-words: late medieval, granaries, macro-remains, environment, diet

‘OLIVE CULTURE’ IN PUGLIA (SE ITALY) - A REVIEW OF THE EVIDENCE FROM PREHISTORY TO THE MIDDLE AGES

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This paper presents a comprehensive study, including evidence from various sources, of the history of the olive plant in Puglia from Prehistory to the Middle Ages. The primary source of information is archaeological sites, where the remains of olives, olive presses and furnaces for the production of olive amphorae have been found. The survey also includes palynological sequences from natural records and written documents referring to olive groves.

Our study shows that olive trees have been cultivated since the Early Neolithic, but it is only during the Middle Bronze Age that the domestic-looking type appeared in the region, a consequence of selective cultivation of the wild type.

The domestication of the olive had been completed by the first half of the 1st millennium BC, during the Iron Age-Archaic period, when remains of olive appear outside the plant's area of natural distribution.

The intensification of exchanges with the Greeks during the Hellenistic period favoured the spread of olive cultivation and led to the construction of olive-presses. The Roman conquest incentivized the production of olive oil, which was successfully traded during the Republican and Early Imperial periods. Economic developments and political turmoil led to a crisis of olive production, which did not fully recover until the 10th century AD. Under the Normans and Swabians, olives became a key crop and a major asset for the economy of Puglia.

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Key-words: Olive culture, Apulia, long-term history

THE ROMAN VILLA OF VILLAMAGNA (URBISAGLIA, MACERATA - ITALY): PILOT ARCHAEOBOTANICAL ANALYSIS

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The Roman villa of Villamagna, in the *ager* of the colony of *Pollentia-Urbs Salvia*, covers a long time-span between the 1st century BC and the 7th century AD. Later, on its ruins, on the Hill on which it stands, will be built the castle of *Villamaina*, razed in 1191 and abandoned in 1422. The roman villa is characterised by a *pars massaricia* and a *pars dominica*, due to its monumental structure it is likely that the villa belonged to an important *gens* of the *Pollentia-Urbs Salvia* roman colony. In 2000, the Soprintendenza Archeologica per le Marche began to excavate the site, and it continue to do so in 2007, 2009 and 2010. Lately, in 2017, the University of Macerata took over the excavation and samples for archaeobotanical analysis were collected from the warehouses and a room of *pars dominica* of the villa. Seed and fruit remains were analysed in the Laboratory of Archaeobotany and Palaeoecology of the University of Salento.

Almost three-thousand carpological remains were examined, all the major cereals are attested (*Hordeum* sp., *Triticum* sp., *Avena* sp.), but minor cereals are attested only during the Roman phase. The edible legumes are very few. Two different catchment areas, one dry and one humid, have been proposed. Seven taxa of fruit trees have been recognized. The biometric analysis carried out on the seeds of *Vitis*, the most represented taxa (2248 pips remains), have determine that the specimens are of the wild type, perhaps a cultivated variety of the area.

Key-words: roman villa, Villamagna, biometric analysis, seed/fruit remains

THE COMPLEXITY OF AGRICULTURAL PRACTICES IN THE BRONZE AGE IN APULIA (SOUTHEAST ITALY): THE CONTRIBUTION OF THE ARCHAEOBOTANICAL MORPHOMETRIC ANALYSIS ON *VICIA FABA* L.

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During the last decades, the archaeobotanical research carried out in Apulia region (SE Italy) highlights the complexity of agricultural practices in the II millennium BC, a crucial moment in

the history of the relationship between man and nature.

Recent investigation reveal the role of *V. faba* (variety *minor*), among the earliest cultivated plant in the ancient world.

In this study, we present the results of biometric and morphometric analyses carried out on ancient seed of *V. faba* L., dated to different chronological periods.

One group of archaeological samples of *V. faba* var. *minor*, collected from the protohistoric sites of Coppa Nevigata, Apani and Roca, was compared with a group found in historical sites of the same region and with a modern reference collection of *V. faba* var. *minor* and *equina*.

The analysis of transformation in seed morphology provides accurate criteria to discriminate between different *cultivar* and to identify possible improvements occurred during the protracted cultivation of the specie.

The study offered a base to compare well-preserved archaeological remains to modern varieties, and to assess the potential of biometric analysis for the characterization of legumes.

The comparison between the biometric and morphometric results obtained for the modern carbonized samples and for the archaeological samples allowed to highlight the differences between the different groups. Insights into local in agricultural practices that include the use of *V. faba* L. can be inferred from our results.

Key-words: Vicia faba, Apulia, Bronze Age, biometry, morphometry

ARCHAEOBOTANICAL RESEARCH IN A 15TH-16TH CENTURY REFUSE PIT IN PIAZZA G. DI VAGNO, CORATO (APULIA, SE ITALY)

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Archaeological excavation carried out in Piazza G. Di Vagno, in historical hearth of Corato, allowed to identify four different phases of occupation which reflect the transformation the city underwent between the 14th and the 18th century AD.

The earliest phase includes seven burials, dated to the 14th century, which were obliterated by a monastic complex dated to the 15th century. During the 16th century (3rd phase) a small church was built on the ruins of the monastery, and later, in the 17th-18th century, three buildings were added next to the church (4th phase).

The building and the pits dated to the 2nd phase provide interesting clue about the monks' diet between the 15th and the 16th century. The particular chemical-physical conditions in the pit favoured the preservation of several seeds both in late Medieval and in modern age urban contexts. Grape (*Vitis vinifera*), cucurbits (*Cucumis melo/sativum*) and Pomoideae (*Pyrus/Malus*), associated with citrus fruit (*Citrus* sp.) seeds are the most frequent ones, and point to a specific diet. Moreover, the latter are used also in the pharmacopoeia.

This archaeobotanical assemblage is one of the rare examples in Apulia during these centuries and provides useful information on the monks' food-habits and the natural remedies they might have used between the 14th and the 18th century.

Key-words: South of Italy, Modern Age, Urban Archaeology, Plant macroremains

AGRICULTURAL PRODUCTION AND ENVIRONMENTAL CHANGES DURING THE BRONZE AGE IN SHAHR-I SOKHTA (SE IRAN)

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This study presents the results of the archaeobotanical analysis carried out at the UNESCO site of Shahr-i Sokhta, located in the Sistan area of Iran. The Sistan plateau is a key area to investigate different aspects of human resilience and vulnerability in the face of climatic and environmental changes that occurred during the Bronze Age. The abrupt changes in rainfall regimes led to a reduction in the water resources available to the community that inhabited Shahr-i Sokhta.

Our research aims to understand the correlation between climate/environmental conditions and the types of cereals cultivated, harvested, processed, stored and consumed. Archaeobotanical analysis has been carried out on plant remains (charcoals, seeds, fruits) found in one of the rooms of the Building 33, dated to the third phase of the site (2500-2300 a.C.). Preliminary data show the presence of wheat and barley (attested by grains and chaff remains), as well as other species typical of arid environments. The study of chaff remains and weeds allows us to interpret this space as connected to the processing activities of the major cereal cultivated; while the analysis of charcoals shed new light on the use of wood as fuel and the different catchment areas.

Key-words: Iran Sistan, Bronze Age, Agriculture, Climatic changes

AGRICULTURAL “REGIMES” AND PALEO-ENVIRONMENT AT CASALE SAN PIETRO (PA - SICILY) DURING THE MEDIEVAL PERIOD

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The work is part of the Archaeobotanical investigations undertaken by the Laboratory of Archaeobotany and Palaeoecology of University of Salento in the SICTRANSIT project - *The archaeology of Regime Change: Sicily in Transition* (ERC AdG 2016 n. 693600), which aims to investigate medieval Sicily between the V and the XII centuries through a multidisciplinary approach.

During the medieval period, the island experienced a sequence of radical changes due to the succession of different politic powers, such as the Byzantines, Saracens, Normans, and Swabians. Each regime introduced new rules that affected the political establishment, the local economy and culture, which in turn, influenced the agricultural sector. Each new ruler introduced new crops and technological improvements to improve the Sicilian agro-economy.

Information about these changes comes from the major urban sites, but little is known from rural settlements of the period, especially in regards to their farming economy. At this regards the medieval site of Casale San Pietro, is therefore of particular interest: located on the river Platani, Casale is strategically close to the ancient Roman route that connected Palermo to Agrigento.

Archaeobotanical analysis has been carried out on charcoals and seed/fruits remains collected in different archaeological context of Casale San Pietro (from V to XII cent.). The data collected allowed a first reconstruction of ancient environment, in terms of vegetation cover, as well as on agricultural practices, in particular in regards to tree fruits cultivation.

Key-words: Medieval Sicily, agricultural practices, Castronovo di Sicilia, Regime changes

READING THE RITUAL PRACTICES OF THE IV CENTURY BC WORSHIP PLACE AT CASTRO-LOCALITÀ CAPANNE (LE): THE CONTRIBUTION OF ARCHAEOBOTANY

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In this work, we try to integrate the archaeobotanical analysis with the archaeological data in order to reconstruct the ritual practices of an ancient cult place located in Castro. The site of *Castrum Minervae*, inhabited since the II millennium BC, is located on a slight hill along the Adriatic coast of the Salento Peninsula, 47 km south from Lecce (Italy). In Località Capanne, the investigations were concentrated in the Hellenistic sanctuary dedicated to the goddess Minerva, where votive offerings and traces of consumption of ritual meals are clearly documented. In particular, the archaeobotanical analysis focused on plant macro-remains (charred seeds/fruits and charcoals) collected in soil samples from the sacred offerings buried underneath the altar. The archaeobotanical record provide crucial information about the role the plants and crops played in the ritual, but also about the environment surrounding the site of *Castrum* in the II millennium BC. Moreover, the discovery of a remarkable number of A.C.O. (Amorphous Charred Objects), analyzed via SEM, allowed to add information about the use of processed-food in rituals.

Key-words: Salento, Italy, Hellenistic period, plant offerings, doughs, SEM analysis

MEDIEVAL GRANARIES AND STOREHOUSES IN MIRANDUOLO (SIENA, ITALY): INVESTIGATING SOCIO-ECONOMICAL ASPECTS THROUGH PLANT REMAINS AND STABLE ISOTOPES SIGNATURES

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The first evidences related to Miranduolo archaeological site (Chiusdino, SI) date back to the 7th century AD, when a village was found to exploit the rich mineral resources available in the area. Between the end of the 7th and the beginning of the 8th century AD, some important changes in the agricultural production system took place. These transformations, clearly detectable in the archaeological record, point out at the key role played by new the storage systems in Mirandulo. In particular, the frequency and location, together with the typology and structural traits of storage facilities suggests a social differentiation in crops collecting and foodstuffs distribution, according to a certain hierarchy.

The aim of our work is to investigate plants remains and their isotopes values ($\delta^{13}C$ and $\delta^{15}N$) from different kind of storage systems (storehouse, silos) and belonging to various social groups (peasant, blacksmith, landowner) in order to reconstruct farming production changes as well as their socio-economic implications at Miranduolo during this crucial period. In particular, specific attention will be paid to those aspects related to the growth condition of the stored crops as possible markers of field's provenience and/or harvest selection.

Key-words: storage system, crops, isotopic analysis, Miranduolo

LANDSCAPE EXPLOITATION AT ANCIENT *AKRAI* (SE SICILY) FROM LATE HELLENISTIC TO LATE ANTIQUE PERIODS: NEW DATA FROM BIOARCHAEOLOGICAL INVESTIGATIONS

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Ancient *Akrai*, near the modern town of Palazzolo Acreide, is located at the top of the Acremonte plateau, one of the hills forming the Hyblaean Mountains in south-eastern Sicily. The archaeological site is characterized by karst and steep slopes and presents a Mediterranean climate.

Akrai, as a sub-colony was founded by Syracuse in 664/663 BC and developed under its influence until 212 BC, when became a part of the first Roman province. From that moment, the town was inhabited until the Late Antiquity.

The aim of this work is to reconstruct - through the archaeobotanical analysis of plant remains - the natural and cultural landscapes, dietary preferences, food production and storage systems in the area around *Akrai* from the Late Hellenistic until the Late Antique period.

Our study provides a diachronic view of the site's life and economy and the environmental changes that occurred around the site during its life span. Preliminary results show that the investigated area was almost continuously occupied and suggest that the landscape, the strategic location (at the top of a hill) and the environmental resources (springs, rivers and forests) were very important in the growth and the development of the town.

Key-words: bioarchaeology, landscape, environment, ancient Akrai, south eastern Sicily

SU ZEYTI: THE TRADITIONAL TECHNIQUE OF OLIVE OIL PRODUCTION IN ANATOLIA

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Antakya, the ancient name being Antiochia, is one of the oldest cities around the Mediterranean Sea. Located at the very southern part of Turkey, next to Aleppo - Syria, the region has a reputation for local agricultural products.

Olive oil is one of those special products with a peculiar taste. The town named Altınözü, in the Antiochian Region, has millions of olive trees, including very old ones more than 500 years old. The wide variety of local olive trees, some of them being endemic, with different peculiar tastes and textures naturally have paved the way for developing an "olive and olive oil culture" through the centuries in the region. Various techniques still have been used in olive and olive oil production for years. The "water washed olive oil" production technique is one of them. This technique is based on the careful collection of the oil accumulated on warm water in special pools after the ripe olives are crushed by means of the grinding stone in the form of cylinders. The study of these traditional techniques shed new light on possible ancient ones.

Key-words: Olive oil, traditional, water washed olive oil, Antiochia