SMALL PREY, BIG INSIGHTS:

UNRAVELING THEIR ROLE IN ARCHAEOLOGY

SPBI BOOK OF ABSTRACTS

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Real Margalef, C., Rufà, A., Carvalho, M.,
Haws, J., Pérez Luis, L. J., & Sanchis Serra, A.

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CONTENT

PRESENTATION

The **Small Prey, Big Insights: Unraveling their Role in Archaeology** congress is the first international meeting entirely devoted to the study of small prey in archaeological contexts, with particular emphasis on Palaeolithic assemblages. By bringing together research focused on small terrestrial mammals, birds, reptiles, amphibians, and aquatic taxa—often overlooked in traditional archaeological narratives—the congress seeks to advance our understanding of past human subsistence strategies, taphonomic processes, and the broader social and ecological roles of these species.

The main objective of the meeting is to create an interdisciplinary space for dialogue and collaboration, integrating perspectives from zooarchaeology, taphonomy, palaeoecology, experimental archaeology, and ethnography. Through this exchange, the congress aims to highlight the importance of small prey remains for reconstructing human behavior, environmental interactions, and site formation processes.

The scientific program is organized into four thematic areas that address these issues from complementary viewpoints:

- **Thematic 1. The role of small prey in human subsistence and site formation processes**

This session explores the economic, ecological, and cultural dimensions of small prey exploitation and its contribution to understanding human adaptive strategies.

- **Thematic 2. Taphonomic approaches and methodological advances**

Dedicated to the latest analytical developments in bone surface modification studies, identification techniques, and quantitative methods applied to small faunal assemblages.

- **Thematic 3. Experimental and neotaphonomic studies**

Focused on experiments and actualistic research that provide comparative frameworks to interpret accumulation and modification processes in the archaeological record.

- **Thematic 4. Regional case studies and broader perspectives**

Presenting site-based and regional analyses that contribute to a more comprehensive view of human–small prey relationships across different geographic and chronological contexts.
Through these sessions, Small Prey, Big Insights seeks to promote methodological innovation, foster interdisciplinary collaboration, and reinforce the visibility of small prey studies as a key component in archaeological research.

DAY 1

BLOCK I

ALL THE SMALL THINGS: MULTI-TAXA SMALL PREY ASSEMBLAGES

IT ALL STARTED WITH A RABBIT:
NEW PATHS TO OLD QUESTIONS

Cristina Real [1] / **Milena Carvalho** [2] / **Jonathan Haws** [3, 2] / **Leopoldo Pérez** [4, 5] / **Anna Rufà** [2, 6] / **Alfred Sanchis** [7]

KEYWORDS
- Zooarchaeology
- Experimental archaeology
- Taphonomy
- Small prey

1 Departament de Prehistòria, Arqueologia i Història Antiga. Facultat de Geografia i Història, Universitat de València, Grupo de Investigación PREMEDOC, Av. Blasco Ibáñez, 28, 46010 València, Spain. cristina.real@uv.es

2 ICArEHB – Interdisciplinary Center for Archaeology and Evolution of Human Behaviour, Universidade do Algarve, Campus de Gambelas 8005-139 Faro, Portugal.

3 Dept. of Anthropology, University of Louisville, Louisville, KY 40208 USA.

4 Área de Prehistoria, Departamento de Geografía e Historia, Facultad de Humanidades, Universidad de La Laguna, Campus de Guajara, 38200, San Cristóbal de La Laguna, Spain.

5 Institut Català de Paleoecologia Humana i Evolució Social (IPHES-CERCA), Zona Educacional 4, Campus Sescelades URV (Edifici W3), 43007, Tarragona, Spain.

6 Univ. Bordeaux, CNRS, MCC, PACEA, UMR 5199, F-33600 Pessac, France.

7 Museu de Prehistòria de València, Servei d'Investigació Prehistòrica (SIP), Diputació de València, Corona 36, 46003 València, Spain.

ABSTRACT

Since the early twentieth century, zooarchaeological research in the Iberian Peninsula has progressively recognized the relevance of small prey, particularly leporids, in Paleolithic human subsistence. Early studies already explored experimental approaches to understand anthropogenic modifications on rabbit bones—such as cut marks, tooth marks, and thermal alterations—seeking to distinguish human activities from those produced by other agents. Over the decades, these pioneering efforts have evolved into a robust neotaphonomic framework that integrates controlled experimentation and taphonomic analysis to interpret human behavior in small prey exploitation. Within this context, our research team has launched the project "Snack or Menu? Exploring the exploitation and preservation techniques of small prey by Neanderthals and modern humans". This initiative aims to develop a comprehensive and systematic experimental program to investigate cooking and preservation technics applied to rabbits, focusing on roasting, smoking, and sun-drying. By replicating these processes, we seek to identify diagnostic patterns in bone surface modifications and to evaluate the potential use of preservation techniques by Paleolithic human groups. These reflections, rooted in a century of Iberian zooarchaeological research on leporids, ultimately inspired the organization of the present congress—a space to discuss new data, methodologies, and perspectives on small prey, extending beyond rabbits to other taxa that have long remained in the background of archaeological narratives.

MIXED ORIGIN OF A SMALL VERTEBRATE ASSEMBLAGE:

EXAMPLE FROM THE MIDDLE PLEISTOCENE CAVE SITE OF LUNEL-VIEL (HÉRAULT, FRANCE)

Jean-Philip Brugal [1] / **Corentin Bochaton** [2] / **Thomas Garcia-Fermet** [3] / **Loic Lebreton** [1]

KEYWORDS
- Meso-Microfauna
- Middle Pleistocene
- Taxonomy
- Taphonomy

1 UMR 7269 LAMPEA, CNRS, Aix-Marseille Univ., France jean-philippe.brugal@univ-amu.fr

2 ISEM, Univ Montpellier, CNRS, IRD, France.

3 UMR 7194 HNHP, Univ. Perpignan, France.

ABSTRACT

The archeo-paleontological site of Mas des Caves at Lunel-Viel (Southern France), mainly the cave n° 1 (or LV I), has been known from the 19th century (M. de Serres). The cave is a long sub- rectilinear karstic gallery developed in a Miocene limestone (molasse), and the original entrance is formed following the destruction of the roof creating a vertical access (sinkhole). The site was excavated in the 20th century (E. Bonifay) and has been the subject of a new excavation since 2019 (JPB). This site yields a rich archeo-paleontological assemblages dated to the end of the Middle Pleistocene and composed of a diversified fossil association of small, medium, and large vertebrates reported to a temperate period (MIS 7). The site is mainly interpreted as a large and regular hyena den. In this presentation, we will focus on the small vertebrate assemblage collected thanks to selected sieving through the sequence. This assemblage is composed of turtles, squamates, amphibians, birds, chiropters, insectivores, rodents, and leporids. Regarding the herpetofauna, the fossil assemblage is rich in testudine remains but also includes some snakes, lizards and amphibians. Previous studies, completed by our data, of the bird collection show a rich taxonomic diversity (33 taxa). Small mammals are represented by many bats, insectivores and rodents. Lagomorphs are also represented by a small sized rabbit. Preliminary taphonomical study of the small species assemblage indicates various accumulation modes: natural death, raptors pellets, small and large carnivore predation, and possibly human action (on birds). The topography of the cave, which partly functioned as a pit-fall, could explain the occurrence of small animals naturally trapped in the site, but the site was also used by several non-human and human predators, making it an especially interesting taphonomic case of study.

ON THE TRAILS OF THE SMALL HUNTERS:

NEW INSIGHTS FROM QUIBAS (LATE EARLY PLEISTOCENE; ABANILLA, MURCIA)

Saverio Bartolini-Lucenti [1, 2] / Joan Madurell-Malapeira [1] / Andrea Faggi [1] / Albert Navarro-Gil [3] / Jordi Agustí [4, 2] / Pedro Piñero [5, 2]

KEYWORDS
- Carnivora
- Small predators
- Quibas
- Glacial-interglacial

1 Dipartimento di Scienze della Terra, Paleo[Fab]Lab , Università degli Studi di Firenze, via La Pira 4, 50121, Florence, Italy.
saverio.bartolinilucenti@unifi.it

2 Institut Català de Paleontologia Miquel Crusafont, Universitat Autònoma de Barcelona, Edifici ICTA-ICP, Carrer de les Columnes s/n, Campus de la UAB, 08193, Cerdanyola del Vallès, Barcelona, Spain.

3 Universitat de Barcelona, Departamento de Dinámica de la Tierra y del Océano, Facultad de Ciencias de la Tierra Martí i Franqués, s/n, E-08028 Barcelona, Spain.

4 IPHES-CERCA, Institut Català de Paleoecologia Humana i Evolució Social, Zona Educacional 4, Campus Sescelades URV (Edifici W3), 43007 Tarragona, Spain.

5 Departament de Botànica i Geologia, Universitat de València, Doctor Moliner 50, 46100 Burjassot, Spain.

ABSTRACT

Small carnivorans are rarely recorded in Quaternary fossil assemblages and have received comparatively less attention than large predators such as sabertoothed cats, cave lions, or cave hyaenas. Nevertheless, their ecological significance as sensitive indicators of climatic and environmental change deserves greater emphasis, especially when compared to the more generalist, resilient, or highly social large carnivorans. Recent taphonomic studies have also underscored the role of some medium- to small-sized carnivorans as bone accumulators in Paleolithic contexts. We present here the first comprehensive study of the small carnivoran assemblage from the Early Pleistocene site of Quibas, highlighting their value as paleoenvironmental indicators and potential site accumulators. Our analyses identified the presence of *Lynx pardinus, Felis silvestris, Vulpes alopecoides, Meles meles*, and Mustelidae indet. in deposits magnetostratigraphically dated to the Jaramillo subchron (1.07–0.99 Ma) and correlated with the glacial MIS -30.
The taxonomic composition suggests a heterogeneous mosaic environment composed of open grasslands interspersed with dense shrublands and mixed broad-leaved forests, providing suitable habitats for these predators to hunt and consume small prey such as rabbits, hamsters, voles, wood mice, shrews, or hedgehogs.

UNDER THE SHADOW OF MEGAFAUNAL REMAINS:

TAPHONOMY AS A TOOL AND THEORETICAL BACKGROUND TO UNDERSTAND THE RELEVANCE OF SMALL FAUNAS IN THE SUBSISTENCE OF THE EARLIEST INHABITANTS OF TAGUA TAGUA, CENTRAL CHILE.

Álvaro Lizama-Catalán [1] / **Rafael Labarca** [2] / **Carlos Tornero** [3]

KEYWORDS
- Pleistocene
- South America
- Taphonomy
- Small vertebrates
- Megafauna

1 International Erasmus Mundus Master in Quaternary and Prehistory, Universitat Rovira i Virgili, Tarragona, Spain. algalica@gmail.com

2 Escuela de Antropología, Facultad de Ciencias Sociales, Pontificia Universidad Católica de Chile, Santiago, Chile.

3 Universitat Autònoma de Barcelona, Barcelona, Spain.

ABSTRACT

Taguatagua 1, 2 and 3 are the oldest open-air archaeological sites in Central Chile (12,600 – 11,600 cal BP), with unambiguous interaction between early hunter-gatherers and extinct megafauna, like proboscideans, deer and horses. Two of these, TT-1 and TT-3, extend their record into the Holocene (8,200 cal AP). They are in the ancient lakeshore of a present-day drained lake, where butchering activities were made, expressed in cutmarks, burned surfaces, and bone tools, as was the case with TT-1. Spatially associated, an extensive and diverse record of small vertebrates has also been recovered (Class: Amphibia, Aves, Mammalia, Reptilia and Teleostei). Through taphonomic studies, a mixed origin can be attributed to the faunal assemblage, with humans and non-human agents conforming the faunal record, which includes predators and environmental changes. With a deeper understanding of their taphonomic trajectories, it has been possible to reconstruct how and why the animals died, but also how different combinations of taphonomic processes shaped the faunal composition in the area and their variations through time. Fauna and taphonomy are the key concepts of this presentation. The later is intimately shaped by experimental archaeology, where the observation of present-day taphonomic processes provides a background to understand how different small taxa are affected differentially by similar taphonomic agents, but also to evaluate how they happened, in which sequences, and how they are influenced by factors like region and environment. Also, cultural decisions such as what and how animals are processed and consumed follow differentiated paths that can be identified through taphonomic studies. Several case studies have been largely discussed in Europe and North America, but the taxonomic and taphonomic scenarios are utterly distinct from South America, where new studies are needed for a deeper understanding of how the faunal assemblages are deposited and generated in the local archaeological records.

SMALL PREY FROM THE MIDDLE AND LATER STONE AGE DEPOSITS AT CONTREBANDIERS CAVE, ATLANTIC COAST, MOROCCO

Emily Yuko Hallett [1] / Lillian Befeler [1] / Maggie Black [1] / Andy M. Breslin [1] / Anna Duncan [1] / Kyle Robinson [1] / Mohamed / Abdeljalil El Hajraoui [2]

1 Department of Anthropology, Loyola University Chicago, USA. ehallett2@luc.edu

2 Institut National des Sciences de l'Archéologie et du Patrimoine, Rabat, Morocco.

KEYWORDS
- Middle Stone Age
- Pleistocene
- Morocco
- Small prey
- Coastal
- Cave

ABSTRACT

Large prey items have historically been the primary focus of Middle Stone Age zooarchaeological research, while butchery patterns, capture strategies, and quantitative analyses of small prey have not received as much research attention. This research describes the relative proportion of small prey in the diet of early humans living in coastal Morocco during the Middle Stone Age (MSA) and Later Stone Age (LSA) from a Pleistocene cave. Contrebandiers Cave is located on the Atlantic Coast of Morocco and is approximately 250 meters from the current shoreline. MSA and LSA stone tool industries were identified in the cave. The cave deposits have been chronometrically dated to ~120,000– 90,000 years ago (MSA) and ~20,000 years ago (LSA). A total of 11,206 well-preserved vertebrate bone and tooth fragments were excavated and piece-plotted or captured during screening. Artiodactyls, perissodactyls, tortoises, birds, carnivores, snakes, and fish are among the 67 identified vertebrate taxa predominantly accumulated by humans. The vertebrate faunal assemblage from Contrebandiers Cave indicates that humans were hunting and processing large, medium, and small-bodied prey from open and mixed habitats. The species with the highest number of identified fragments in the Contrebandiers Cave vertebrate assemblage is *Testudo graeca* (Greek tortoise). Small-bodied taxa with cut marks and burning include rabbits, hares, porcupines, birds, tortoises, foxes, and cats. Coastal fish skeletal remains were also identified. Results from the taxonomic identification and taphonomic analysis of the small-bodied prey are presented here.

BLOCK II

ZOOARCHAEOLOGICAL AND TAPHONOMIC ANALYSIS OF SMALL PREY: REPTILES

FRESHWATER TURTLES IN THE IBERIAN MESOLITHIC:

CONTRIBUTIONS AND CHALLENGES FOR UNDERSTANDING SMALL PREY EXPLOITATION.

Raquel Moya [1] / Alfred Sanchis [2] / Javier Fernández-López de Pablo [1]

KEYWORDS
- Mesolithic
- Subsistence strategies
- Freshwater turtles
- Iberian Peninsula
- Taphonomy
- Small prey

1 Instituto Universitario de Investigación en Arqueología y Patrimonio Histórico (INAPH), University of Alicante, Carretera de San Vicente del Raspeig s/n, 03690, San Vicente del Raspeig, Alicante, Spain.
raquel.moya@ua.es

2 Museu de Prehistòria de Valencia, Servei d'Investigació Prehistòrica (SIP), Diputació de València, Spain.

ABSTRACT

The role of small prey in Mesolithic subsistence strategies remains understudied, particularly regarding freshwater turtles. This contribution presents the results of a recent taxonomic and taphonomic analysis of chelonian remains from the site of El Collado (Oliva, eastern Iberia), currently the most significant Mesolithic assemblage of this kind in the Iberian Peninsula.
The study identified more than 300 turtle remains (*Emys orbicularis* and *Mauremys leprosa*), corresponding to a minimum of 25 individuals, distributed across all levels of the site's stratigraphy. Taphonomic evidence—including anatomical representation, thermal alterations, and absence of carnivore modifications—strongly supports anthropogenic accumulation and roasting. The comparison with other Iberian and European sites highlights major interpretative challenges, especially due to the frequent absence of specific studies or detailed contextual information. The case of El Collado thus not only provides new insights into the systematic exploitation of freshwater turtles but also illustrates the limitations that still hinder broader understanding of small prey roles in postglacial human adaptation.
The presentation will discuss these results and their implications for the development of a more nuanced narrative of Mesolithic subsistence in Mediterranean contexts.

SQUAMATE REPTILES AS A DIETARY RESOURCE IN THE TERMINAL PLEISTOCENE-EARLY HOLOCENE SOUTHERN LEVANT:

INSIGHTS FROM TAPHONOMY AND PREY CHOICE.

Ma'ayan Lev [1] / **Cheryl Makarewicz** [1]

1 Institute for Prehistoric and Protohistoric Archaeology, University of Kiel, Germany.
mlev@ufg.uni-kiel.de

KEYWORDS
- Squamate
- Taphonomy
- Natufian
- Pre-Pottery Neolithic
- Prey-rank models

ABSTRACT

Prey ranking models used to interpret zooarchaeological datasets typically distinguish between slow, high-ranked small game and fast, low-ranked small game in order to assess hunting and gathering decisions in a context of variable resource availability. However, squamate reptiles (lizards and snakes) are usually excluded from these models. This study investigates the role of squamate reptiles in human diets during the Terminal Pleistocene and Early Holocene, focusing on their active exploitation at the Natufian and Pre-Pottery Neolithic in the southern Levant. While ethnographic accounts attest to squamate use in small-scale societies, zooarchaeological evidence for their consumption remains understudied This research addresses how human exploitation of squamates can be identified archaeologically, integrating experimental archaeology, taxonomic and taphonomic analyses and species-specific traits. Cut marks, burning, absence of digestion, and body size selection all support anthropogenic accumulation, while the repeated targeting of large-bodied taxa, from diverse biogeographic zones, suggests deliberate foraging and strategic exploitation across a mosaic landscape. Altogether, squamates provide a unique view into localized resource use, prey choice, and human-environment engagement during a period of increasing sedentism and subsistence intensification in the southern Levant.

GHOST IN THE SHELL:

TORTOISE EXPLOITATION IN THE MIDDLE PALAEOLITHIC SITE OF LES AUZIÈRES (SOUTHEASTERN FRANCE)

Marie Messiez-Poche [1] / **Camille Daujeard** [2] / **Nicolas Frerebeau** [3] / **Jean-Baptiste Fourvel** [4]

KEYWORDS
- Middle Palaeolithic
- MIS5
- Tortoise exploitation
- Southeastern France
- Les Auzières
- Zooarchaeology-Taphonomy

1 MNHN, Paris, France.
messiez.marie@gmail.com

2 MNHN, CNRS UMR 7194-HNHP, Paris, France

3 UMR 6034-Archéosciences, Bordeaux, France.

4 UMR 5608-TRACES, Université Toulouse Jean-Jaurès, Toulouse, France.

ABSTRACT

While tortoise exploitation during the Middle Palaeolithic has been documented at few Mediterranean sites, Les Auzières (Méthamis, Southeastern France) stands out for its exceptionally large assemblage. Excavated for a decade, the site has yielded numerous faunal remains and lithic artefacts belonging to Neanderthal settlements, including an outstanding collection of *Testudo hermanni* (717 specimens) with fragmented shells and a dozen of partially complete individuals. Most of them have been unearthed from US215, a stratigraphic layer dated to c. 110,000 years before present (MIS 5). The archaeological context, marked by the presence of lithic artefacts, butchered mammalian remains, charcoals and heated stones, raises the question of an anthropogenic origin of this assemblage. This study presents a taphonomic and zooarchaeological analysis of part of the assemblage to identify the depositional and post-depositional processes. Our study reveals well preserved remains with limited abiotic processes damage, overrepresentation of shells with frequent anatomical connections and low fragmentation. Besides, some heating, percussion and peeling marks were observed. These preliminary taphonomic and zooarchaeological data, together with contextual evidence, support a primarily human origin for the accumulation, offering key insights into Neanderthals interaction with small game in Southeastern France.

TURNING TURTLE:
ON CHELONIAN INCIDENCE DURING PALAEOLITHIC IN THE IBERIAN PENINSULA

· **Iratxe Boneta** [1, 2]

KEYWORDS
· Pleistocene
· Testudines
· Turtle consumption
· Dietary strategies
· Small game

1 Departamento de Prehistoria y Arqueología. Facultad de Filosofía y Letras. Ciudad Universitaria de Cantoblanco. C/ Francisco Tomás y Valiente 1, 28049 Madrid, Spain. iratxeboneta@gmail.com

2 Arqueozoo S.L. C/Arroyo Fontarrón 373, 28030 Madrid, Spain.

ABSTRACT

In recent decades, the study of Testudines remains recovered in Palaeolithic contexts from the Iberian Peninsula has provided significant data concerning hominin prey selection and subsistence strategies. Chelonian Quaternary Iberian taxa, the extant Hermann's tortoise (*Chersine hermanni* i.e. *Testudo hermanni*), the Iberian pond turtle (*Mauremys leprosa*) and the European pond turtle (*Emys orbicularis*), have been unequally documented during Iberian Peninsula Palaeolithic record (ca. 1.3/1.25 myr – 6 ky BC). From an archaeological perspective, these fluctuations reflect significant change in the species geographical distribution through this large period and in the incidence of small prey within game selection.
From a turtle perspective, the aim of this work is to recapitulate the available information in the Iberian record on species distribution, hominin hunting behaviour and cooking techniques. The Iberian data will be compared with other species and other European records to provide perspective on these dietary strategies. The obtained results reflect a marginal but relevant trend that reinforces the idea of heterogeneity within hominid dietary strategies.

SMALL PREY REMAINS AND INDUSTRIAL ACTIVITIES IN MEDIEVAL BARCELONA

Lluís Lloveras [1] / Vanesa Triay [2] / Philip Banks [3] / Jordi Nadal [1] / Marta Fàbregas [2] / Santiago Riera [1]

1 SERP, Departament d'Història i Arqueologia, Universitat de Barcelona, Barcelona, Spain.
lluislloveras@ub.edu

2 Atics S.L., Mataró, Spain.

3 Independent researcher.

4 SERP, Departament d'Història i Arqueologia, Universitat de Barcelona, Barcelona, Spain.

KEYWORDS
- Rabbits
- Small carnivores
- Fur
- Tanneries
- Medieval archaeology
- Zooarchaeology
- Taphonomy

ABSTRACT

Small prey assemblages have been widely studied in archaeology, especially in relation to human subsistence during prehistoric periods. However, their role in historical contexts, and beyond subsistence, has received significantly less attention. This study presents the results of an analysis of small prey mammal assemblages recovered from medieval layers at El Born archaeological site in Barcelona. The samples originate from 11th-to-13th-century contexts excavated in two adjacent areas known as Casa Riera and Casa Duran. In both contexts, small prey remains are abundant, with predominance of rabbits and small carnivores such as cats, dogs, foxes, and ermine. Taphonomic analysis suggests these animals were primarily exploited for fur production. The data show how waste small animal bones can offer insights into industrial activities emphasizing the role of animal product-based-industries operating in medieval Barcelona. Our findings align with historical records that highlight the city's importance as a center for leather and fur production during the Middle Ages.

POSTERS
BLOCK

FIRST TAPHONOMIC INSIGHTS INTO LAGOMORPH ACCUMULATIONS AT THE AURIGNACIAN LEVELS OF COVA FORADADA (XÀBIA, SPAIN)

Leopoldo Pérez [1, 2] / María Luz Arce [3] / Alba Soto [3] / Magdalena Gómez-Puche [3] / Josep Casabó [4] / Javier Fernández-López de Pablo [3]

KEYWORDS
- Lagomorphs
- Pleistocene
- Upper Paleolithic
- Site formation
- Bone accumulations
- Anatomic Modern Humans

1 Área de Conocimiento de Prehistoria; Departamento de Geografía e Historia; Facultad de Humanidades; Universidad de La Laguna, Campus Guajara, 38200 San Cristóbal de la Laguna, Santa Cruz de Tenerife, Spain. lperezlu@ull.edu.es

2 Institut Català de Paleoecologia Humana i Evolució Social (IPHES-CERCA), Zona Educacional 4. Campus Sescelades URV (Edifici W3), 43007 Tarragona, Spain.

3 Instituto Universitario de Investigación en Arqueología y Patrimonio Histórico (INAPH), University of Alicante, Carretera de San Vicente del Raspeig s/n, 03690, San Vicente del Raspeig, Alicante, Spain.

4 Tècnic d'Arqueologia Unitat de Patrimoni Cultural, Generalitat Valenciana, Spain.

ABSTRACT

In the Mediterranean region of Iberia, lagomorphs are a ubiquitous small prey systematically used by human groups along the whole Upper Paleolithic. Yet, during the Aurignacian period in this region, zooarchaeological and taphonomic analyses on leporid accumulations are still rather limited to few sites. In this poster, we introduce new data focused on the analyses of lagomorphs at the Aurignacian levels of Cova Foradada (Xàbia, Spain), which had not been previously analyzed. We report preliminary taxonomic, quantitative measures, age at death and taphonomic evidence on a representative sample of levels V, VB, VI and VII of sector I from the excavations of J. Casabó (1995-2001). Our results show a complex and mixed pattern of lagomorphs' accumulations produced by natural deaths, humans and non-human predators with slight diachronic differences along the Aurignacian archaeological sequence. The ongoing study of lagomorphs from sector II should better contextualise this trend, introducing some intra-site variability factors.

TAPHONOMIC SIGNATURES IN A SMALL MAMMAL ASSEMBLAGE FROM THE EARLY PLEISTOCENE SITE OF QUIBAS (SOUTHERN IBERIAN PENINSULA)

Albert Navarro-Gil [1] / Sara García-Morato [2] / Marc Furió [3, 4] / Shubham Pal [3] / Claudia Iannicelli [5, 6] / Casto Laborda-López [7] / Jordi Agustí [5, 6, 4] / Pedro Piñero [8, 4]

KEYWORDS
- Jaramillo subchron
- Small mammal accumulation
- Birds of prey
- Hydrodynamics
- Bone alteration

1 Universitat de Barcelona, Departamento de Dinámica de la Tierra y del Océano, Facultad de Ciencias de la Tierra Martí i Franqués, s/n, E-08028 Barcelona, Spain. navarrogil1@gmail.com

2 Instituto de Historia, Dpto de Arqueología y Procesos Sociales. Despacho 2E14. C/ Albasanz 26, San Blas-Canillejas 28037, Madrid, Spain.

3 Departament de Geologia, Universitat Autònoma de Barcelona, 08193, Bellaterra, Spain.

4 Institut Català de Paleontologia Miquel Crusafont, Universitat Autònoma de Barcelona, Edifici ICTA-ICP, Carrer de les Columnes s/n, Campus de la UAB, 08193, Cerdanyola del Vallès, Barcelona, Spain.

5 IPHES-CERCA, Institut Català de Paleoecologia Humana i Evolució Social, Zona Educacional 4, Campus Sescelades URV (Edifici W3), 43007 Tarragona, Spain.

6 Àrea de Prehistòria, Universitat Rovira i Virgili (URV), Avinguda de Catalunya 35, 43002 Tarragona, Spain.

7 Departamento de Geología (Unidad Asociada al IACT-CSIC), Universidad de Jaén; Facultad de Ciencias Experimentales, Campus Las Lagunillas s/n, 23071, Linares Jaén, Spain.

8 Departament de Botànica i Geologia, Universitat de València, Doctor Moliner 50, 46100 Burjassot, Spain.

ABSTRACT

The Quibas site (Early Pleistocene, Murcia, Spain) preserves the only continuous European sequence of continental vertebrates from pre- to post-Jaramillo subchron. This sequence follows the earliest known hominin presence in Europe, documented at Barranco León, Fuente Nueva 3 (southern Spain), and Sima del Elefante (northern Spain). This study provides new insights into the taphonomic processes involved in the accumulation of small mammals in unit QS-2/3 of the Quibas-Sima section. We examined modifications caused by predators (digestion and chewing), root marks, mineral precipitation, bone breakage, abrasion, corrosion, and the representation of long bones. Results indicate that the accumulation occurred in situ, mainly due to the activity of nocturnal birds of prey such as Strix aluco. Evidence suggests a minimal hydrodynamic influence. The paleoecological data support the presence of a forest-mosaic environment with open areas around the site at the onset of the Jaramillo subchron.

SEASONAL EXPLOITATION PATTERNS OF MARINE MOLLUSCS DURING THE AURIGNACIAN IN COVA FORADADA (XÀBIA, SPAIN)

Asier García-Escárzaga [1,2] / Magdalena Gómez-Puche [3] / Ester Verdún [4] / Oriol Montero-Buc [3] / Josep Casabó [5] / Javier Fernández-López de Pablo [3] / Igor Gutiérrez-Zugast [6]

KEYWORDS
- Coastal Archaeology
- Mediterranean
- Intertidal resources
- Oxygen isotopes
- Subsistence strategies

1 Laboratory of Human Evolution-IsoTOPIK Lab, Department of History, Geography and Communication, Faculty of Humanities and Communication, University of Burgos, Burgos, Spain. asier.garcia@ubu.es

2 Department of Prehistory and Institute of Environmental Science and Technology (ICTA-UAB), Universitat Autònoma de Barcelona, Bellaterra, Spain.

3 Instituto Universitario de Investigación en Arqueología y Patrimonio Histórico (INAPH), University of Alicante, Carretera de San Vicente del Raspeig s/n, 03690, San Vicente del Raspeig, Alicante, Spain.

4 Independent Researcher.

5 Tècnic d'Arqueologia Unitat de Patrimoni Cultural, Generalitat Valenciana, Spain.

6 Instituto Internacional de Investigaciones Prehistóricas de Cantabria (Universidad de Cantabria, Banco Santander, Gobierno de Cantabria), Santander, Spain.

ABSTRACT

Cova Foradada (Xàbia, Spain) is one of the very few sites in the Mediterranean basin where the exploitation of marine molluscs as food resource have been robustly documented during the Aurignacian period. Previous research has reported quantitative, taphonomic and biometric evidence on the three main taxa documented at the site: *Mytilus galloprovincialis, Patella* sp., and *Phorcus turbinatus*. However, our current understanding about the patterns of marine mollusc accumulations and its seasonal use within the main Aurignacian levels had not been previously assessed. In this poster, we present preliminary data on the ongoing research aimed to improve the chrono-stratigraphic resolution and seasonality of shellfish exploitation patterns at Cova Foradada. Our new approach is based on (i) the prior archaeo-stratigraphic identification of marine mollusc on hearth-related assemblages; and (ii) sequential stable oxygen isotope analysis of *Phorcus turbinatus* and *Patella* spp. species. We believe such integrated approach can provide new research venues to understand the relationship between the use of mollusc resources with both the mobility patterns and occupation dynamics during the Aurignacian period.

TAPHONOMIC INSIGHTS INTO SMALL PREY FROM GRAN DOLINA (ATAPUERCA, SPAIN):

SUBLEVELS TD10.3 AND TD10.4.

Javier Villalobos [1, 2] / **Palmira Saladié** [1, 2, 3] / **Antonio Rodríguez-Hidalgo** [4, 1, 2]

KEYWORDS
- Middle Pleistocene
- Taphonomy
- Sierra de Atapuerca
- Small carnivores
- Mixed assemblages

1 Institut Català de Paleoecologia Humana i Evolució Social (IPHES-CERCA), Zona Educacional nº4 (Edifici W3), Campus Sescelades URV, 43007 Tarragona, Spain. javiervillalobosruiz@gmail.com / jvillalobos@iphes.cat

2 Àrea de Prehistòria, Universitat Rovira i Virgili (URV), Av. de Catalunya 35, 43002 Tarragona, Spain.

3 Departamento de Paleobiología, Unidad Asociada a CSIC, Museo Nacional de Ciencias Naturales, C/ José Gutiérrez Abascal 2, 28006 Madrid, Spain.

4 Instituto de Arqueología-Mérida, Consejo Superior de Investigaciones Científicas (CSIC-Junta de Extremadura), Plaza de España 15, 06800 Mérida, Spain.

ABSTRACT

Small prey constitutes an important part of the diets of several predators. Moreover, they often inhabit and breed in caves or rock shelters, naturally contributing to the faunal assemblages producing mixed accumulations. TD10.3 and TD10.4 sublevels of the Gran Dolina site (Sierra de Atapuerca, Spain) yield mixed assemblages with human and carnivore activity, the latter being predominant. Among the 12,742 specimens examined, 2.4% correspond to small-prey taxa (N = 303). Here we present preliminary results from the zooarchaeological and taphonomic analysis of spatially recorded mesofaunal remains at these layers. Identified taxa include rodents (marmot, porcupine, beaver), leporids, birds of various sizes (mainly corvids), and small carnivores. Medium-sized birds (45.5%) and leporids (24.4%) dominate, represented mainly by wing bones and tibiae/coxae respectively. Fracture frequency is high (93.4%), but only eight bones show green breakage, four of which are due to carnivore activity. No anthropogenic or raptor beak marks occurred. Carnivore modifications are frequent (14.3%), including pits, punctures, scores, two scooping outs, one crenulated edge, and two digested bones (one with tooth marks). Leporids, medium-sized birds, and small carnivores show similar modification frequencies (ffi 8–10%), with carnivore marks also on two of five large bird remains. Multivariate analyses reveal similarities between the leporid remains in the assemblage and neotaphonomic studies of fox predation, while results for medium-sized birds remain inconclusive. Our results support the interpretation of a mixed assemblage with no evidence of anthropogenic activity.

THE LEPORIDS OF EL SALT:
ARCHAEOSTRATIGRAPHIC STUDY ON THE ORIGIN OF BONE ASSEMBLAGES OF THE XB ESTRATIGRAPHIC UNIT

Jaime Mir-Lápido [1] / Leopoldo Pérez [2, 3] / Santiago Sossa-Ríos [4] / Carolina Mallol [2, 5] / Cristo M. Hernández Gómez [2, 5]

KEYWORDS
- Neanderthals
- Lagomorphs
- Archaeostratigraphy
- Spatial analysis
- Zooarchaeoelogy

1 Màster en Arqueologia del Cuaternario y Evolución Humana, Universitat Rovira i Virgili. Av. Catalunya, 35, 43002, Tarragona, Spain. Jaime.mir.lapido@gmail.com

2 Área de Conocimiento de Prehistoria; Departamento de Geografía e Historia; Facultad de Humanidades; Universidad de La Laguna, Campus Guajara, 38200 San Cristóbal de la Laguna, Santa Cruz de Tenerife, Spain.

3 Institut Català de Paleoecologia Humana i Evolució Social (IPHES-CERCA), Zona Educacional 4, Campus Sescelades URV (Edifici W3), 43007 Tarragona, Spain.

4 Departament de Prehistòria, Arqueologia i Història Antiga, Universitat de València, Avinguda Blasco Ibáñez 28, 46010 Valencia, Spain.

5 Archaeological Micromorphology and Biomarker Research Laboratory; Instituto Universitario de Bio-Orgánica Antonio González; Universidad de La Laguna, Campus Anchieta, San Cristóbal de la Laguna, 38296 Santa Cruz de Tenerife, Spain.

ABSTRACT

El Salt (Alcoy, Alicante), in line with the majority of Middle Palaeolithic sites along the Iberian Mediterranean region, contains a remarkably high number of leporid remains (*Oryctolagus cuniculus* Such assemblages are typically identified, from a taphonomic perspective, as non-anthropic accumulations produced by birds of prey and small carnivores, and are consequently dismissed by disciplines such as archaeostratigraphy and spatial analysis, despite their potential. This study seeks to explore this issue through the remains recovered from excavations 5, 5–6, and 6 of Stratigraphic Unit Xb at El Salt. Following archaeozoological and taphonomic analysis, GIS tools were employed. Our results show the existence of natural accumulation periods that are temporally separated from other accumulation periods related to anthropic or mixed inputs. This data reveals important implications regarding temporal variability within the accumulations, as well as for the identification of “high density areas” where certain post-depositional processes appear to have a greater impact on the record. The findings highlight the untapped potential of this approach for spatial and archaeostratigraphic analysis in understanding both natural and anthropic leporid accumulations, and underscore its value in elucidating site formation dynamics in the Iberian Mediterranean context

FISH IN THE MAGDALENIAN RECORD OF THE SOUTHEASTERN IBERIAN PENINSULA:

NEW EVIDENCE FROM CUEVA DE LOS MURCIÉLAGOS (ALBUÑOL, GRANADA, SPAIN)

Laura Llorente-Rodríguez [1] / Danai Rovithaki [1] / Maria Herrero-Otal [2] / Pedro Henríquez-Valido [2] / Blas Ramos Rodríguez [3] / Rafael M. Martínez Sánchez [4] / Luis Miguel Zahonero Gómez [5] / Antonio Peralta Gómez [6] / José A. Lozano Rodríguez [7] / Francisco Martínez-Sevilla [2]

KEYWORDS
- Magdalenian
- Cueva de los Murciélagos
- Fish remains
- Gilthead

1 Laboratory for Archaeozoological Studies-Leiden Universiteit. Leiden, The Netherlands. l.llorente.rodriguez@arch.leidenuniv.nl

2 Departamento de Historia y Filosofía, Área de Prehistoria, Universidad de Alcalá, Spain.

3 Laboratorio de Arqueología Biocultural (MEMOLab) de la Universidad de Granada, Spain.

4 Departamento de Historia, Universidad de Córdoba, Spain.

5 Laboratorio de Arqueología Biocultural (MEMOLab) de la Universidad de Granada, Spain.

6 Instituto de Historia, Departamento de Arqueología y Procesos sociales, CSIC (Consejo Superior de Investigaciones Científicas), Spain.

7 Centro Oceanográfico de Canarias (COC), Instituto Español de Oceanografía (IEO-CSIC), Spain.

ABSTRACT

The exploitation of aquatic resources during the Palaeolithic is an important topic in Archaeology due to its relationship with how humans where interacting with different environments and its contribution to the development of new technologies and even art. However, one of the most relevant components for human exploitation from any aquatic environment, fishes, are often underrepresented in the archaeological record, due mostly to taphonomical and geological processes transforming shorelines, water bodies and climate. The ichthyoarchaeological record of the Southeastern coast of the Iberian Peninsula is a case in point with only a few published fish records, constituting one of the most pressing challenges regarding ancient human use of aquatic resources in the area.

This paper presents the fish assemblage from the Magdalenian levels from Cueva de los Murciélagos (Albuñol, Granada, Spain), where the presence of the euryhaline gilthead seabream (*Sparus aurata* L.) stands out. The taphonomical and body size reconstruction of the fish remains allow us to understand the role of fish while giving clues on the exploitation of different habitats by the humans inhabiting the cave. Integrated into the overview of fish evidence from the region, the fish collection from Cueva de los Murciélagos will therefore expand our understanding of how humans adapted to acquire more complex and/or diversified strategies during the Magdalenian in the Spanish Levant

EATING TERRAPINS:
INSIGHTS FROM GRAVETTIAN LEVEL XVIA OF THE COVA DE LES CENDRES (ALICANTE, SPAIN)

Iratxe Boneta [1, 2] / Cristina Real [3] / Alfred Sanchis [4] / Valentín Villaverde [3]

KEYWORDS
- Archaeozoology
- Upper Palaeolithic
- Spanish Levant
- Emys orbicularis
- Dietary strategies

1 Departamento de Prehistoria y Arqueología. Facultad de Filosofía y Letras. Ciudad Universitaria de Cantoblanco. C/ Francisco Tomás y Valiente 1, 28049 Madrid, Spain. iratxeboneta@gmail.com

2 Arqueozoo S.L. C/Arroyo Fontarrón 373, 28030 Madrid, Spain.

3 Departament de Prehistòria, Arqueologia i Història Antiga. Facultat de Geografia I Història, Universitat de València, Av. Blasco Ibáñez, 28, 46010 València, Spain. Grupo de Investigación PREMEDOC.

4 Museu de Prehistòria de València, Servei d'Investigació Prehistòrica (SIP), Diputació de València, Corona 36, 46003 Valencia, Spain.

ABSTRACT

Cova de les Cendres (Alicante, Spain) is one of the most important prehistoric sites of the Spanish Levant due to its long-spanning archaeological record expanding from the Upper Palaeolithic to the Bronze Age. Faunal remains have been studied in different levels, predominantly mammals, that provide less information on the human exploitation of aquatic environments. In the Gravettian level XVIA (22.7-24.8 ka BP), coinciding with a rich accumulation of anthropogenic archaeological remains, a distinctive faunal assemblage was recovered primarily consisting of rabbit remains (>85%), but where deer was also a notable prey, followed by wild goat, horse, wild boar, aurochs, and a wide variety of carnivores.

Within this assemblage, seventeen terrapin remains attributed to the extant European pond terrapin (*Emys orbicularis*) were retrieved. The documented anthropogenic modifications, including thermal alterations and cut marks, point towards the consumption of these reptiles by Gravettian populations.

The presence of these remains provides information about exploitation of the surrounding environments by human groups and their diet.

THE MUSTELID CLUE:

TRACING HIDDEN PREDATORS IN LEPORIDAE RECORD FROM LEVEL TE9D AT SIMA DEL ELEFANTE SITE (SIERRA DE ATAPUERCA, SPAIN)

Maria Boada [1, 2] / **Rosa Huguet** [1, 2, 3]

KEYWORDS
- Early Pleistocene
- Taphonomy
- Sima del Elefante
- Predators
- Mustela

1 Institut Català de Paleoecologia Humana i Evolució Social (IPHES-CERCA), Zona Educacional 4, Campus Sescelades URV (Edifici W3), 43007 Tarragona, Spain. mboada@iphes.cat

2 Universitat Rovira i Virgili, Departament d'Història i Història de l'Art, Avinguda de Catalunya 35, 43002 Tarragona, Spain.

3 Departamento de Paleobiología, Unidad Asociada a CSIC, Museo Nacional de Ciencias Naturales, C/ José Gutiérrez Abascal 2, 28006 Madrid, Spain.

ABSTRACT

The Sima del Elefante site is known for hosting the earliest human populations in Europe. One of the main objectives in studying is to document and identify the different processes and agents involved in the formation of fossil accumulation.
In this work, we focus on the leporid remains from level TE9d of this site. To identify the agents that acted upon these remains, we conducted a zooarchaeological and taphonomic study. Currently, there are many actualistic and archaeological studies related to the predation and consumption of leporids by birds of prey and small carnivores such as lynxes and foxes. However, there are other smaller carnivores that also act on leporids, about which there is very little information available. In the study of TE9d, based on anatomical representation and bone surface modifications, we identified the action of multiple predators on the remains of leporids, including a medium-sized carnivore (*Lynx* sp.), a nocturnal raptor (*Bubo bubo*), and a small mustelid (*Mustela* cf. *palerminea/praenivalis*). Recognising the specific taphonomic marks left by these agents, especially mustelids, contributes to a better understanding of predator-prey dynamics and the formation processes of small mammal assemblages, providing new insights into ecological interactions during the Early Pleistocene.

TAPHONOMIC ORIGIN OF SMALL GAME REMAINS ACROSS THE MIDDLE-TO-UPPER PALEOLITHIC SEQUENCE OF COVA FORADADA (CALAFELL, NE IBERIA)

Antonio Rodríguez-Hidalgo [1, 2] / **Carmen Núñez-Lahuerta** [3, 4, 2, 5] / **Juan Ignacio Morales** [2, 5]

KEYWORDS
- Iberia
- Chatelperronian
- Aurignacian
- Leporids
- Birds
- Mixed Assemblages

1 Instituto de Arqueología-Mérida, Consejo Superior de Investigaciones Científicas (CSIC-Junta de Extremadura), Mérida, Spain.
ajrh78@gmail.com

2 Institut Català de Paleoecologia Humana i Evolució Social (IPHES-CERCA), Zona Educacional nº4 (Edifici W3), Campus Sescelades URV, 43007 Tarragona, Spain.

3 Departamento de Geología, Facultad de Ciencia y Tecnología, Universidad del País Vasco/Euskal Herriko Unibertsitatea UPV/EHU, Barrio Sarriena s/n, 48940 Leioa, Spain.

4 Aragosaurus-IUCA, Departamento de Ciencias de la Tierra, Facultad de Ciencias, Universidad de Zaragoza, C/ Pedro Cerbuna, 12, 50009 Zaragoza, Spain.

5 Àrea de Prehistòria, Universitat Rovira i Virgili (URV), Av. de Catalunya 35, 43002 Tarragona, Spain.

ABSTRACT

Small-prey bone assemblages often have mixed origins, with contributions from humans, non-human predators and natural intrusions, yet their role in subsistence strategies during the Early Upper Paleolithic remains poorly documented in Iberia. This study analyses the taphonomic origin of small game from Layers IIIn, IIIc, IV, IV.1, and IV.2 of Cova Foradada (Calafell), a key site documenting the Middle-to-Upper Paleolithic transition in NE Iberia.

Quantitative and qualitative indicators (including burning, shaft cylinder frequency, tooth marks, cut marks, and fragmentation) were assessed to identify the primary accumulation and modification agents. Leporids dominate the faunal assemblage (47.2–74.2% NISP), with peaks in IV.1 and IV.2. Burned bones are most frequent in IIIn (21.1%) and IIIc (5.4%), matching the distribution of combustion features. Shaft cylinders, indicative of intensive anthropogenic processing, reach their highest proportion in IV (8.0%) and moderate levels in IIIn (6.6%). Tooth marks increase toward IV.2 (9.7%), pointing to growing carnivore involvement, likely Lynx pardinus. These data indicate a diachronic shift from human-driven accumulation and processing in IIIn–IIIc to mixed human–carnivore formation in IV–IV.2. Avian remains, though less abundant, are dominated by corvids and Passeriformes, suggesting birds of prey as primary accumulators, with occasional lynx and human input.

Overall, the small game assemblage shows strong evidence for changing taphonomic pathways over time, reflecting shifts in site use, human subsistence strategies, and the interplay with non-human predators during the Middle-to-Upper Paleolithic transition.

DAY 2

BLOCK III

LEPORIDS IN THE ARCHAEOLOGICAL RECORD

ANTHROPOGENIC EXPLOITATION OF LEPORIDS DURING THE EARLY GRAVETTIAN AT COVA DE LES CENDRES (ALICANTE, SPAIN)

Abel Martínez [1]

KEYWORDS
- Iberian Mediterranean
- Gravettian
- Leporids
- Taphonomy
- Diet

1 Departament de Prehistòria, Arqueologia i Història Antiga. Facultat de Geografia I Història, Universitat de València, Av. Blasco Ibáñez, 28, 46010 València, Spain.
amargras@alumni.uv.es

ABSTRACT

Leporids are an important part of the diet of both humans and other predators, although from the Gravettian onwards, it plays a greater role in the human diet. Given this situation, the taphonomic analysis of fractures and bone surface modifications (cut marks, tooth marks and thermal alterations) is considered a key point, not only in discriminating the responsible agent, but also in determining the methods of human consumption. In this regard, experimental studies aiming to reproduce the possible ways in which rabbits were processed and consumed by humans are crucial as a comparative framework for identifying the causes of the modifications and interpreting the Palaeolithic human behaviour.
This paper presents the results of the archeozoological and taphonomic study of the leporids from the early Gravettian layers (level XVIB, 25.6-26.0 ky BP) of Cova de les Cendres. In addition, the taphonomic data are compared with various experimental studies with the ultimate aim of identifying the exploitation methods (processing, cooking and consumption) and the resources used by human groups during this phase of occupation.

FOLLOWING THE LYNX:

TAPHONOMIC INSIGHTS INTO LEPORID ACCUMULATIONS FROM UNIT 2 OF COVA DEL COLL VERDAGUER (IBERIAN PENINSULA)

Souksavath Sanphasouk [1, 3] / **Maria Joana Gabucio** [2, 3] / **Patricia Martín Rodríguez** [2, 3] / **Montserrat Sanz** [4] / **Joan Daura** [4]

KEYWORDS
- Upper Pleistocene
- Leporidae
- Taphonomy
- Medium-sized carnivores

1 Departamento Studi Umanistici, Università degli Studi di Ferrara Corso Ercole I d'Este, 32, 44121 Ferrara, Italy & Universitat Rovira i Virgili, Departament d'Història i Història de l'Art, Avinguda de Catalunya 35, 43002 Tarragona, Spain. spssouksavath@gmail.com

2 Institut Català de Paleoecologia Humana i Evolució Social (IPHES-CERCA), Zona Educacional 4, Campus Sescelades URV (Edifici W3), 43007 Tarragona, Spain.

3 Universitat Rovira i Virgili, Departament d'Història i Història de l'Art, Avinguda de Catalunya 35, 43002 Tarragona, Spain.

4 Grup de Recerca del Quaternari, GRQ-SERP, Department of History and Archaeology, Universitat de Barcelona, C/ Montalegre, 6, 08001, Barcelona, Spain.

ABSTRACT

Leporids are an abundant taxon in Upper Pleistocene sites of the Iberian Peninsula, commonly accumulated through various processes, including human activity, animal predation, and natural burrowing. The main objective of this study is to identify the agent(s) responsible for the leporid accumulation in Unit 2 of Cova del Coll Verdaguer, an Upper Pleistocene deposit. A total of 2,606 leporid remains and 25 remains of medium-sized carnivores -*Lynx pardinus, Vulpes vulpes*, and *Felis silvestris*- were analysed using zooarchaeological and taphonomic methods. The leporid assemblage is characterized by a predominance of distal appendicular elements, followed by cranial, proximal appendicular, axial, and innominate bones. The results, including breakage patterns and tooth marks, suggest that the accumulation of leporids was primarily the result of lynx activity, with a lesser contribution by foxes, highlighting the significant role of medium-sized carnivores in Pleistocene faunal assemblages.

LYNXES AND LEPORIDS IN THE MIDDLE PALEOLITHIC OF COVA FORADADA D'OLIVA (VALENCIA, SPAIN):

ARCHAEOZOOLOGICAL AND TAPHONOMIC ANALYSIS AND IMPLICATIONS FOR NEANDERTHAL SUBSISTENCE

Vasiliki Stalika [1] / **Aleix Eixea** [1] / **Alfred Sanchis** [2]

1 Departament de Prehistòria, Arqueologia i Història Antiga. Facultat de Geografia I Història, Universitat de València, Av. Blasco Ibáñez, 28, 46010 València, Spain. vassostalika98@gmail.com

2 Museu de Prehistòria de València, Servei d'Investigació Prehistòrica (SIP), Diputació de València, Spain.

KEYWORDS
- Neanderthals
- Taphonomy
- Iberian lynx (*Lynx* sp.)
- Leporids
- Middle Paleolithic
- Predator-prey relationships
- Human subsistence strategies
- Zooarchaeology

ABSTRACT

This study examines from a taphonomic perspective, assemblages of Iberian lynx (*Lynx* sp.) and leporid remains from Middle Paleolithic levels of Cova Foradada d'Oliva (Valencia, Spain). The aim is to determine the origin of these small prey deposits in the cave.

Lynx remains are rare in Middle Paleolithic contexts, and evidence of human predation on this species is scarce. Leporids, particularly rabbits, are abundant in Paleolithic faunal assemblages from the Iberian Mediterranean region, but their presence is mainly attributed to the activity of birds of prey and small carnivores. There is some evidence of Neanderthal predation on rabbits, though not comparable to what is seen in the Upper Paleolithic of the region. Moreover, the ecological predator-prey relationship between lynx and rabbit still present today in various Iberian Peninsula ecosystems, adds another layer of interest to the study.

Our data link both lynx and leporid remains to the predatory activity of Neanderthal groups that occupied the cave in different phases. The analysis suggests the flexibility in Neanderthal diets and the complexity of their resource use strategies. It also raises the possibility of ecological competition with other predators. Overall, this study provides relevant data for better understanding Neanderthal subsistence, economy, and social organization in the Iberian Peninsula.

WHEN LESS IS MORE INSIGHTS FROM AN AGENT-BASED MODEL GROUNDED IN OPTIMAL FORAGING THEORY OF RABBIT EXPLOITATION DURING THE LAST GLACIAL MAXIMUM IN IBERIA

Samuel Seuru [1] / Ariane Burke [2] / Liliana Perez [3]

KEYWORDS
- Agent-based model
- Optimal Foraging Theory
- Social division of labor
- European rabbit
- Net-hunting
- Upper Palaeolithic
- Iberian Peninsula

1 Aix-Marseille Université. Laboratoire Méditerranéen de Préhistoire Europe Afrique - LAMPEA - CNRS - Ministère de la Culture, 5 Rue Château de l'Horloge, 13090, Aix-en-Provence, France. samuel.seuru@univ-amu.fr

2 Université de Montréal. Département d'anthropologie, Pavillon Lionel-Groulx, 3150 Jean-Brillant, Montréal, QC H3T 1N8, Canada.

3 Université de Montréal. Département de géographie, Complexe des sciences, 1375 Avenue Thérèse-Lavoie-Roux, Montréal, QC H2V 0B3, Canada.

ABSTRACT

During the Upper Palaeolithic, especially the Last Glacial Maximum, the European rabbit (*Oryctolagus cuniculus*) dominates many faunal assemblages in Iberia. Despite its abundance, interpretations of its role in human subsistence remain diverse and debated, highlighting the complexity of understanding the economic, technological, environmental, and social implications of rabbit exploitation. This research investigates the motivations behind rabbit hunting by exploring how humans exploited this small game. By combining Optimal Foraging Theory with Agent-Based Modeling, we simulate hunting decisions and group behaviors to assess the daily energetic efficiency over 50 years of different strategies observed in the ethno-historical record. Our simulation outputs show that diet composition and daily energetic returns were influenced by social organization, technology, and hunting strategy. Moreover, results suggest that humans may have mass collected rabbits from warrens using nets and a division of labor based on age and/or gender. Ultimately, we argue for a broader recognition of small game as central to understanding past subsistence patterns. Indeed, beyond economics and technology, we show here that rabbit exploitation may provide crucial insights into the socio-cultural dynamics of human groups during the Last Glacial Maximum in the Iberian Peninsula.

BLOCK IV

MULTI-PROXY APPROACHES TO THE STUDY OF FISH AND OTHER SMALL PREY

HARVESTING THE WHITE SEA CATFISH DURING THE MIDDLE STONE AGE AT KLASIES RIVER MAIN SITE AND BLOMBOS CAVE, SOUTH AFRICA

Asia Alsgaard [1] / Carin Andersson [2] / Ulysses Ninnemann [3] / Karen van Niekerk [1, 4]

KEYWORDS
- Hunter-gatherers
- Coastal resources
- Stable isotope analysis
- Fish remains
- Otoliths

1 Dept. of Archaeology, History, Cultural Studies and Religion, Centre for Early Sapiens Behaviour, University of Bergen, Norway. asia.alsgaard@uib.no

2 NORCE Norwegian Research Centre, Bjerknes Centre for Climate Research, Norway.

3 Bjerknes Centre for Climate Research, University of Bergen, Norway.

4 School of Geography, Archaeology and Environmental Studies, University of the Witwatersrand, Johannesburg, South Africa.

ABSTRACT

Within the South African Middle Stone Age (MSA), fish have remained relatively underdiscussed when compared to other coastal resources such as shellfish. However, they have the potential to provide valuable insight into how and where coastal resource harvesting occurred. We add to previous studies by discussing past human harvesting practices of white sea catfish (*Galeichthys feliceps*) during the MSA at Klasies River Main Site and Blombos Cave. Additionally, we conducted carbon and oxygen stable isotope analyses of present day white sea catfish otoliths to explore the possibility of investigating the seasonality of harvest of this species. We combine these present day data with body size reconstructions of the archaeological otoliths from both sites to contextualize where fish harvesting in the past may have occurred. Finally, we discuss the possible implications for our understanding of early modern human harvesting behavior of fish resources.

HUMANS DO NOT LIVE SOLELY ON LARGE GAME. MIDDLE AND UPPER PALEOLITHIC CASE STUDIES TO FISH EXPLOITATION IN SOUTHWESTERN AND CENTRAL EUROPE

Àngel Blanco-Lapaz [1, 2] / Keiko Kitagawa [3] / Ana B. Marín-Arroyo [5] / Igor Guitérrez-Zugasti [6] / Fernando González-Echegaray de Yarto [6] / Manuel R. González-Morales [6]

KEYWORDS
- Fishing
- Human diet
- Paleolithic
- Cantabrian Region
- Swabian Jura

1 Institute for Archaeological Sciences (INA), University of Tübingen, Hölderlinstr. 12, 72074, Tübingen & Germany. angel.blanco-lapaz@uni-teubingen.de

2 Senckenberg Centre for Human Evolution and Paleoenvironment (SHEP), University of Tübingen, Hölderlinstr. 12, 72074, Tübingen, Germany

3 Eberhard Karls Universität Tübingen, Institut für Ur- und Frühgeschichte und Archäologie des Mittelalters, Burgsteige 11, 72070, Tübingen, Germany.

4 Hagellocher Weg 40, 72070, Tübingen, Germany.

5 Grupo de I+D+i EVOADAPTA (Evolución Humana y Adaptaciones durante la Prehistoria), Dpto. Ciencias Históricas, Universidad de Cantabria. Av/Los Castros 44, 39005, Santander, Spain.

6 Instituto Internacional de Investigaciones Prehistóricas de Cantabria (IIIPC) (Universidad de Cantabria-Gobierno de Cantabria-Santander). Av/Los Castros 52, 39005, Santander, Spain.

ABSTRACT

While extensive research exists on land-based resources such as large and, to a lesser extent, small game, the significance of fish in ancient humans' diets and cultural and technological development still needs further exploration. Two pivotal areas in Southwestern and Central Europe, the Cantabrian Region (Iberian Peninsula) and the Swabian Jura (Germany), play a crucial role in studying this topic as zooarchaeologists have analyzed several prolific archaeological sites characterized by high-resolution stratigraphy, abundant anthropogenic remains, of macrofauna, and adequate collecting methods to recover fish remains.
In Paleolithic contexts, conducting a comprehensive study of the contribution of fish to human consumption requires a clear understanding of the origin of fish assemblages. This is because eother natural and biological processes may contribute to their accumulation, such as the occurrence of natural death events or the presence of birds of prey or small to medium-sized carnivores. In this study, we use a multi-proxy analysis, including taphonomy, spatial distribution, seasonality, and body size reconstruction, to compare two sites: the Middle Paleolithic/Aurignacian site of Hohlenstein-Stadel (Swabian Jura) and the Gravettian site of El Salín Cave (Cantabrian Region), to illustrate the role of fish during the Middle and Upper Paleolithic.

READING SHELLS, RECONSTRUCTING LIFEWAYS:

$\delta^{18}O$ INSIGHTS FROM LIMPET SHELLS AT CUEVONA DE ARDINES AND EL CIERRO (ASTURIAS, SPAIN) DURING THE LATE GLACIAL

Alberto Marchán-Fernández [1]

1 Dpto. de Prehistoria, Historia Antigua y Arqueología, GIR PREHUSAL. Universidad de Salamanca. Fac. Geografía e Historia. C. Cerrada de Serranos S/N. 37002 Salamanca, Spain. marchan@usal.es

KEYWORDS
- Shellfishing seasonality
- Palaeoclimate
- Stable oxygen isotopes
- Upper Palaeolithic
- Cantabrian Spain

ABSTRACT

The role of marine resources in prehistoric hunter-gatherer diets has been the subject of considerable debate in recent decades. While some researchers view shellfish as fallback resources during periods of scarcity, others emphasize their broader nutritional importance. Most evidence for this discussion derives from Mesolithic contexts in northern Iberia, with comparatively little data from the Upper Palaeolithic.

This study presents oxygen isotope ($\delta^{18}O$) analyses of Patella vulgata shells from the Cuevona de Ardines and El Cierro caves (Asturias, Spain) to assess seasonal patterns of shellfish collection during the Early Magdalenian (ca. 19,600–18,900 cal BP) and Azilian (ca. 13,600–12,700 cal BP). The results shed light on subsistence strategies, coastal resource exploitation, and human mobility. Additionally, sea surface temperatures were reconstructed from $\delta^{18}O$ values. Findings suggest that shellfish gathering during the Early Magdalenian was concentrated in autumn, followed by summer and spring, with a mean annual SST of ca. 12.5 °C. In the Azilian, autumn harvesting persisted but was more evenly distributed throughout the year, with a mean SST of ca. 14 °C. These results are contextualized through comparison with contemporary archaeological sites.

WAS SHELLFISH GATHERING INFLUENCED BY RED TIDES?

A MESOLITHIC CASE STUDY FROM PORTUGAL

Alejandro León-Cristóbal [1] / Asier García-Escárzaga [2, 3] / Carlos Duarte Simões [4]

KEYWORDS
- Mesolithic
- Atlantic façade
- Stable oxygen isotopes
- Red tides
- Hunter-fisher-gatherers

1 Departamento de Ciencias Humanas, Universidad de La Rioja, Spain.
alejandro.leon@unirioja.es / leoncristobala@gmail.com

2 Departamento de Prehistoria e Instituto de Ciencia y Tecnología Ambientales (ICTA-UAB), Universitat Autònoma de Barcelona, Spain.

3 Laboratorio de Evolución Humana-IsotTOPIK Lab, Departamento de Historia, Geografía y Comunicación, Facultad de Humanidades y Comunicación, Universidad de Burgos, Spain.

4 Interdisciplinary Center for Archaeology and Evolution of Human Behaviour (ICArEHB), Universidade do Algarve, Faro, Portugal.

ABSTRACT

Mesolithic shell middens offer some of the clearest insights into prehistoric life along the Atlantic façade of the Iberian Peninsula. The small aquatic prey forming these deposits, such as limpets, mussels or crabs have traditionally received considerably less attention in archaeological research compared to studies focused on terrestrial fauna. This paper presents and discusses the results of the archaeomalacological study of Mesolithic strata dated to 7000-6000 BCE, as well as the stable oxygen isotope ($\delta^{18}O$) analyses conducted on 22 specimens of Patella depressa Pennant,1777 from the Portuguese shell midden of Castelejo (Vila do Bispo, Algarve). The $\delta^{18}O$ series obtained from limpets indicate that past humans exploited the littoral mainly during spring and late summer, avoiding the warmest period (i.e., July and August). In addition to previous hypotheses, such as the idea that Castelejo was occupied during certain months of the year for the exploitation and processing of shellfish, this raises an important question: were Mesolithic groups deliberately suspending shellfish collection due to environmental factors? Drawing on ethnographic and ethnohistorical sources, along with comparative evidence, we propose that harmful algal blooms (red tides) may have prompted hunter-fisher-gatherer communities to refrain from coastal resource exploitation in late spring, resuming these activities by late summer.

RAPTORS AS A RESOURCE:

NEW INSIGHTS INTO MIDDLE AND UPPER PALEOLITHIC BIRD USE AT WALOU CAVE (BELGIUM) BY NEANDERTHALS AND MODERN HUMANS

Quentin Goffette [1, 2] / Thibaut Devièse [3] / Veerle Rots [2, 4] / Stéphane Pirso [5, 6] / Christina Ryder [7] / Fabrice Bray [8] / Edouard Bard [2] / Lou Spanneut [2] / Christelle Draily [9]

KEYWORDS
- Archaeozoology
- Cut marks
- MIS 3–5/6
- Radiocarbon dating
- Talon
- Traceology
- ZooMS

1 Royal Belgian Institute of Natural Sciences, Directorate Earth and History of Life, Brussels, Belgium.
qgoffette@naturalsciences.be

2 TraceoLab/Prehistory, University of Liège, Liège, Belgium.

3 CEREGE, Aix-Marseille University, CNRS, IRD, INRAE, Collège de France, Technopôle de l'Arbois, BP 80, 13545 Aix-en-Provence, France.

4 F.R.S.-FNRS, Fund for Scientific Research, Brussels, Belgium.

5 Direction scientifique et technique, Agence wallonne du Patrimoine, Namur, Belgium.

6 Department of Geology (RU Geology & Astrobiology) and European Archaeometry Centre (RU Art, 13 Archaeology, Heritage), University of Liège, Liège, Belgium.

7 University of Colorado Boulder, Boulder, United States.

8 Unité d'appui et de recherche (UAR) 3290 Miniaturisation pour la Synthèse, l'Analyse et la Protéomique (MSAP), Centre national de la recherche scientifique (CNRS), University of Lille, Villeneuve D'ascq, France.

9 Direction opérationnelle Zone Centre, Agence wallonne du Patrimoine, Liège, Belgium.

ABSTRACT

Among small animals, birds are still frequently overlooked as potential prey for Paleolithic hunter-gatherers, although they have received increased attention in recent decades. Yet, how prehistoric humans interacted with birds in northwestern Europe remains largely unknown, particularly in the case of Neanderthals.

To help address this gap, we present the results of a study of 670 bird remains from the Middle and Upper Paleolithic sequence of Walou Cave (Liège, Belgium). Archaeozoological and traceological analyses were combined with ZooMS and radiocarbon dating on anthropogenically modified bird bones.

Birds are significantly underrepresented compared to mammals, and the avian assemblage appears to have been largely accumulated by raptors. However, twelve bones bear human modifications, though two are doubtful; they represent rare instances of cut marks on faunal material at Walou. Upper Paleolithic exploitation focused on ptarmigans, possibly for feather or tendon extraction. Most informative are seven Middle Paleolithic specimens, one of which is doubtful; they provide evidence of Neanderthal exploitation of birds in the period between MIS 3 and MIS 5/6. This includes meat processing and, for the first time in Belgium, the manipulation of a raptor talon. Overall, the Walou assemblage reveals direct evidence of a marked Neanderthal interest in both diurnal and nocturnal raptors.

BLOCK V

EXPERIMENTS AND NEOTAPHONOMY

EFFECTS OF COOKING TECHNIQUES ON THE NUTRITIONAL COMPOSITION OF RABBIT MEAT:
AN EXPERIMENTAL APPROACH

Pilar Hernández [1] / **Cristina Real** [2]

1 Institut de Ciència i Tecnologia Animal, Universitat Politècnica de València, Spain. phernan@dca.upv.es

2 Departament de Prehistòria, Arqueologia i Història Antiga. Facultat de Geografia I Història, Universitat de València, Av. Blasco Ibáñez, 28, 46010 València, Spain. Grupo de Investigación PREMEDOC.

KEYWORDS
- Diet
- Drying
- Smoking
- Roasting
- Nutritional
- Rabbit

ABSTRACT

In the Mediterranean Iberian Peninsula, rabbits were a key prey species for Palaeolithic hunter-gatherers, providing high-protein, low-fat meat. Variations in cooking and processing methods may have influenced their nutritional value and, consequently, human diet quality. This study experimentally evaluates how different cooking techniques affect rabbit meat composition.

Twenty-four rabbit carcasses were processed using three methods: roasting, smoking, and sun-drying. Meat was then separated into fore limb, hind limb, and axial portions. Each portion was analysed for fat, fatty acids, moisture, and protein content. Results indicate significant variation by anatomical part and cooking method. Drying consistently resulted in the greatest fat loss, while fore limbs retained the highest protein content after drying. Smoking and roasting produced intermediate values, with notable differences in fatty acid profiles.

These results suggest that processing choices could have influenced the nutritional contribution of rabbit meat to Palaeolithic diets. Moreover, methods such as drying, often linked to preservation, may have altered fat availability while concentrating protein content. Integrating these experimental findings with archaeological evidence can help clarify the subsistence strategies and economic behaviours of Magdalenian groups in the Iberian Peninsula.

EVALUATING THE TAPHONOMIC ROLE OF ERINACEUS EUROPAEUS IN THE MODIFICATION OF RABBIT BONES

Francesc Marginedas [1, 2] / Antonio Rodríguez-Hidalgo [3, 1] / Sergi García [4] / Palmira Saladié [1, 2, 5]

KEYWORDS
- Taphonomy
- Neotaphonomy
- Tooth marks
- Hedgehog
- Rabbit

1 Institut Català de Paleoecología Humana i Evolució Social (IPHES-CERCA), Zona Educacional nº 4 (Edifici W3), Campus Sescelades URV, 43007, Tarragona, Spain. francescm63@gmail.com

2 Área de Prehistòria, Universitat Rovira i Virgili (URV), Avinguda de Catalunya 35, 43002, Tarragona, Spain.

3 Consejo Superior de Investigaciones Científicas, Instituto de Arqueología-Mérida (CSIC-Junta de Extremadura), Plaza de España 15, 06800, Mérida, Spain.

4 Galanthus, Carrtera de Juià 46, 17460, Celrà, Spain.

5 Departamento de Paleobiologia, Unit Associated to CSIC, Museo Nacional de Ciencias Naturales, C/ José Gutiérrez Abascal, 2, 28006, Madrid, Spain.

ABSTRACT

Linear bone modifications, especially cut marks and tooth scores, have long been central to taphonomic research due to their diagnostic value in identifying hominin and carnivore activity. In recent decades, however, a subset of fine striations, sometimes labeled as “scratches or linear marks of unknown origin”, has been reported, particularly on small prey remains. These ambiguous marks complicate interpretations of bone surface modification and warrant further investigation. In this study, we investigated the taphonomic impact of the European hedgehog (*Erinaceus europaeus*) to characterize its range of bone modifications and compare them with archaeological specimens. Although hedgehogs are primarily insectivorous, they are opportunistic animals and facultative scavengers of large and small-sized carcasses. We conducted an experiment involving 12 hedgehogs from the Torreferrussa Wildlife Recovery Center (Barcelona, Spain), exposing semi-defleshed remains of adult and young adult rabbits for up to two days to facilitate direct tooth-to-bone contact. The exposure was alternated to control feeding behavior. Out of 205 rabbit bones, 31.2% (64 bones) exhibited evidence of hedgehog gnawing. Observed modifications included punctures (7.8%), pits (15.6%), scores of various lengths (78.1%), crenulated edges (23.4%), pitting-like damage (78.1%), and furrowing (9.4%). Striations similar to those found in archaeological contexts were generated on four long bones. While these modern traces share morphological similarities with the archaeological examples, they are not identical, suggesting hedgehogs may be considered as potential, but not definitive, agents responsible for certain bone surface modifications in past contexts.

RAW VS ROASTED:
RECONSTRUCTING EARLY HUMAN BUTCHERY PRACTICES OF TERRAPINS AND TORTOISES

Mariana Nabais [1, 2] / **Ruth, Blasco** [3, 4] / **Iratxe Boneta** [5, 6] / **David Gonçalves** [7, 8] / **Marina Igreja** [7, 1] / **Valentina Lubrano** [10] / **Anna Rufà** [10, 11]

KEYWORDS
- Archaeozoology
- Cut marks
- MIS 3–5/6
- Radiocarbon dating
- Talon
- Traceology
- ZooMS

1 UNIARQ – Centro de Arqueologia da Universidade de Lisboa, Portugal. mariananabais@gmail.com

2 SWAD – South-West Archaeology Digs.

3 Institut Català de Paleoecología Humana i Evolució Social (IPHES-CERCA), Zona Educacional nº 4 (Edifici W3), Campus Sescelades URV, 43007, Tarragona, Spain.

4 Área de Prehistòria, Universitat Rovira i Virgili (URV), Avinguda de Catalunya 35, 43002, Tarragona, Spain.

5 Departamento de Prehistoria y Arqueología. Facultad de Filosofía y Letras. Ciudad Universitaria de Cantoblanco. C/ Francisco Tomás y Valiente 1, 28049 Madrid, Spain.

6 Arqueozoo S.L. C/Arroyo Fontarrón 373, 28030 Madrid, Spain.

7 LARC – Archaeosciences Laboratory, Património Cultural.

8 University of Coimbra, Research Centre for Anthropology and Health, Department of Life Sciences. & Centre for Functional Ecology, Laboratory of Forensic Anthropology, Department of Life Sciences.

9 CIBIO – Centro de Investigação em Biodiversidade e Recursos Genéticos, InBio Laboratório Associado.

10 Interdisciplinary Center for Archaeology and the Evolution of Human Behaviour (ICArEHB), FCHS-Universidade do Algarve, Campus de Gambelas, 8005-139 Faro, Portugal.

11 Univ. Bordeaux, CNRS, MCC, PACEA, UMR 5199, 33600 Pessac, France.

ABSTRACT

Chelonid exploitation – including tortoises and terrapins – has been increasingly recognised as a significant element of Palaeolithic subsistence in the Mediterranean and Iberian Peninsula. This study offers an experimental assessment of fire's role in processing these reptiles, contrasting raw and roasted specimens to evaluate impacts on butchery efficiency, surface modifications, skeletal representation and lithic use-wear. The roasting process markedly reduced disarticulation effort and time, irrespective of the operator's experience. Cut marks and percussion traces were more frequent in raw-processed individuals, while burnt specimens displayed extensive thermal damage, particularly on carapace plates. However, Fourier-Transform Infrared Spectroscopy (FTIR) revealed limited diagnostic potential for low-intensity thermal exposure. Conversely, lithic tools used in processing exhibited macroscopic edge damage and minor polishes, paralleling wear patterns documented in the butchery of other small fauna. These results align with archaeological evidence from multiple Iberian and Mediterranean sites, suggesting a culturally structured practice of in-shell roasting and anatomical disarticulation. The finds highlight fire's role in labour optimisation and knowledge transmission, supporting broader discussions on small game exploitation and cognitive planning in early human behaviour.

THE FEAST OF THE EURASIAN EAGLE-OWL (BUBO BUBO): NEOTAPHONOMIC ANALYSIS OF AVIAN REMAINS FROM MUNTANYA DE LA OLIVA (TARRAGONA, SPAIN)

Mario Marqueta [1, 2] / **Maria Boada** [1, 2] / **Carmen Núñez-Lahuerta** [3, 1, 2, 4] / **Rosa Huguet** [1, 2, 5]

KEYWORDS
- Avian accumulations
- Bone modifications
- Consumption pattern
- Eurasian eagle-owl
- Taphonomy

1 Institut Català de Paleoecologia Humana i Evolució Social (IPHES-CERCA), Zona Educacional 4, Campus Sescelades URV (Edifici W3), 43007 Tarragona, Spain. mmarqueta@iphes.cat

2 Universitat Rovira i Virgili, Departament d'Història i Història de l'Art, Av. de Catalunya 35, 43002 Tarragona, Spain.

3 Departamento de Geología, Facultad de Ciencia y Tecnología, Universidad del País Vasco/Euskal Herriko Unibertsitatea UPV/EHU, Barrio Sarriena s/n, 48940 Leioa, Spain.

4 Aragosaurus-IUCA, Departamento de Ciencias de la Tierra, Facultad de Ciencias, Universidad de Zaragoza, C/ Pedro Cerbuna, 12, 50009 Zaragoza, Spain.

5 Department of Paleobiology, Unit Associated with CSIC, National Museum of Natural Sciences (CSIC), Madrid, Spain.

ABSTRACT

Raptors play a key role in the formation of avian bone assemblages. To identify accumulating agents, it is essential to understand the taphonomic patterns resulting from a predator's consumption processes. This study examines three avian assemblages of the same species, the Eurasian eagle-owl (*Bubo bubo*), in Oliva Mountain (Tarragona, Spain), where the owl foraged over the course of a year. Despite occupying the same ecological niche, different consumption patterns were observed among areas. Most remains were accumulated during the breeding season; however, the observed patterns suggest that the predator mainly used this area for roosting. Differences in functionality (plucking, dismemberment, and regurgitation) of the analysed assemblages, according to prey consumption stages by *B. bubo*, were identified. The remains primarily belong to Columbiformes and Passeriformes, showing variations in anatomical representation, beak marks, and digestion damage. This neotaphonomic study focuses on how a nocturnal raptor such as *B. bubo* can produce different avian assemblages depending on the stages of prey consumption, thereby enabling the identification of distinct consumption and accumulation patterns in fossil assemblages and the recognition of potential accumulating agents.

NOT ONLY RABBITS:
NEOTAPHONOMIC INSIGHTS FROM AN EAGLE OWL (*BUBO BUBO*) NEST IN RIUDECOLS (TARRAGONA, NE IBERIA)

Chang Wang [1] / **Jordi Nadal** [1] / **Lluís Lloveras** [1]

1 SERP-Departament d'Història i Arqueologia. Universitat de Barcelona. C/Montalegre 6-8. 08001. Barcelona, Spain. wangchang3637@163.com

KEYWORDS
- Bubo bubo
- Taphonomy
- Archaeozoology
- Pellet
- Digestion
- Diet

ABSTRACT

This paper investigates the feeding patterns of the eagle owl (*Bubo bubo*) by analysing materials collected from a nest located in the forest of Riudecols (province of Tarragona, Spain). A total of 1,602 remains were examined, including rabbits (192), rats (765), other micromammal species (399) and birds (81). The analysis reveals clear differences in consumption patterns based on prey type. The data indicate that owls selectively consume parts of larger prey, such as rabbits and birds, while smaller, including rats and other micromammals, are ingested whole. This marked difference in feeding behaviour is directly related to prey body size, with larger prey being partially consumed and smaller prey being completely ingested. In addition, beak marks on bone surface tend to appear mainly on bones of rabbits and birds. Despite differences in the parts consumed, the degree of digestion is remarkably similar, being moderate to light in all type of prey. This pattern aligns with previous studies on eagle owls, which also report low degree of digestion-related damage to prey remains. The findings are further compared with those of previous studies on other predators to provide broader taphonomic context.

UNRAVELING NEANDERTHAL USE OF SMALL PREY:

EXPERIMENTAL AND TAPHONOMIC INSIGHTS FROM TEIXONERES CAVE (UNIT IIIB)

Goizane Alonso [1] / **Anna Rufà** [2, 3] / **Ruth Blasco** [4, 5]

KEYWORDS
- Small prey
- Neanderthals
- Taphonomy
- Experimental archaeology
- Middle Palaeolithic

1 Universidad de Burgos (UBU), Plaza Misael Bañuelos García, 09001, Burgos, Spain. goizaneac@gmail.com

2 Interdisciplinary Center for Archaeology and the Evolution of Human Behaviour (ICArEHB), FCHS-Universidade do Algarve, Campus de Gambelas, 8005-139 Faro, Portugal.

3 Univ. Bordeaux, CNRS, MCC, PACEA, UMR 5199, 33600 Pessac, France.

4 Institut Català de Paleoecologia Humana i Evolució Social (IPHES-CERCA), Zona Educacional 4, Campus Sescelades URV (Edifici W3), 43007 Tarragona, Spain.

5 Universitat Rovira i Virgili, Departament d'Història i Història de l'Art, Av. de Catalunya 35, 43002 Tarragona, Spain.

ABSTRACT

The interaction between Neanderthals and their environment has always been a topic of interest for the scientific community. In that sense, the role of small prey is another important element to understand the complex human behaviour. Several studies are being conducted to characterise the anthropogenic agency of small animal accumulations through taphonomic patterns. However, mammalian carnivores or birds of prey are also common predators of small animals, leading to potentially mixed accumulations and the formation of palimpsests that might be difficult to interprete. In this context, experimental archaeology has proven to be a useful tool to the determine the specific taphonomic pattern of each agent. In this work, an experimental project was conducted. The aim was to characterise the burning pattern of cooking and waste-cleaning activities on leporid remains. Subsequently, the zooarchaeological and taphonomic analysis of the avian and leporid assemblage from unit IIIb of Teixoneres Cave was carried out. The results suggest a mixed contribution of both non-anthropic and anthropic agents. Mechanical modifications and digestive damage were identified and associated to carnivore activity. On the other hand, anthropogenic activity was confirmed with the presence of cut marks and burnt bones, contributing to the knowledge about the use of small prey by neanderthal groups and their use of fire. Moreover, this work emphasises the importance of experimental archaeology and its application to the archaeological record.

LINES IN QUESTION:

A COLLABORATIVE BLIND TEST ON BONE SURFACE MODIFICATIONS IN SMALL GAME TAPHONOMY

Antonio Rodríguez-Hidalgo [1, 2] / Ruth Blasco [2, 3] / Maria Boada [2, 3] / Milena Carvalho [4] / Rodrigo García-Martín [5] / Jonathan Haws [4, 6] / Rosa Huguet [2, 3, 7] / Juan Marín [8, 9, 2] / Francesc Marginedas [2, 3] / Mario Marqueta [2, 3] / Clara Mielgo [2, 3] / Mariana Nabais [10] / Carmen Núñez-Lahuerta [11, 2, 3, 12] / Leopoldo Pérez [13, 2] / Cristina Real [14] / Anna Rufà [4, 15] / Palmira Saladié [2, 3, 7] / Alfred Sanchis [16] / Montserrat Sanz [17] / Alicia Sanz-Royo [18] / Javier Villalobos [2, 3]

KEYWORDS

• Taphonomy • Bone Surface Modifications • Linear Marks • Cut Marks • Blind Test

1 Instituto de Arqueología-Mérida, Consejo Superior de Investigaciones Científicas (CSIC-Junta de Extremadura), Mérida, Spain. ajrh78@gmail.com

2 Institut Català de Paleoecologia Humana i Evolució Social (IPHES-CERCA), Zona Educacional 4, Campus Sescelades URV (Edifici W3), 43007 Tarragona, Spain.

3 Universitat Rovira i Virgili, Departament d'Història i Història de l'Art, Av. de Catalunya 35, 43002 Tarragona, Spain.

4 ICArEHB–Interdisciplinary Center for Archaeology and Evolution of Human Behaviour, Universidade do Algarve, Faro, Portugal.

5 Department of Archaeology, University of Cambridge, United Kingdom.

6 University of Louisville, Department of Anthropology, Louisville, United States of America.

7 Departamento de Paleobiología, Unidad Asociada a CSIC, Museo Nacional de Ciencias Naturales, C/ José Gutiérrez Abascal 2, 28006 Madrid, Spain.

8 Departamento de Prehistoria y Arqueología, Universidad Nacional de Educación a Distancia (UNED), Madrid, Spain.

9 UMR 7194, Institut de Paléontologie Humaine, CNRS-Museum National d'Histoire Naturelle, Paris, France.

10 UNIARQ, Centro de Arqueologia da Faculdade de Letras da Universidade de Lisboa, Lisboa, Portugal.

11 Departamento de Geología, Facultad de Ciencia y Tecnología, Universidad del País Vasco/Euskal Herriko Unibertsitatea UPV/EHU, Barrio Sarriena s/n, 48940 Leioa, Spain.

12 Aragosaurus-IUCA, Departamento de Ciencias de la Tierra, Facultad de Ciencias, Universidad de Zaragoza, C/ Pedro Cerbuna, 12, 50009 Zaragoza, Spain.

13 Área de Prehistoria, Departamento de Geografía e Historia, Universidad de La Laguna, San Cristóbal de La Laguna, Spain.

14 Departament de Prehistòria, Arqueologia i Història Antiga, Universitat de València, València, Spain. Grupo de Investigación PREMEDOC.

15 Univ. Bordeaux, CNRS, MCC, PACEA, UMR 5199, 33600 Pessac, France.

16 Museu de Prehistòria de València, Servei d'Investigació Prehistòrica (SIP), Diputació de València, València, Spain.

17 Grup de Recerca del Quaternari (GRQ-SERP), Departament d'Història i Arqueologia, Universitat de Barcelona. Spain.

18 Department of Archaeology, University of Aberdeen, Aberdeen, Scotland. National Museums Scotland, Edinburgh, UK.

ABSTRACT

Small game has long been eclipsed by large game in zooarchaeological narratives. Yet, over the past decades, they have emerged as powerful windows into diet breadth, technological innovation, cognitive complexity, and adaptive strategies of ancient societies. In anthropogenic contexts, bone surface modifications such as cut marks, breakage, human tooth marks, and thermal alterations, are key to disentangling the origins of assemblages. Among these, cut marks are the most definitive signature of human intervention.

Despite major methodological advances in taphonomy, including extensive experimental and neo-taphonomic studies that have generated robust reference frameworks, equifinality continues to challenge interpretation. Identification of surface modifications remains largely qualitative in small game studies, and quantitative approaches are still rare in small-game research—leaving certain traces difficult to classify within current models.

This contribution invites conference participants to take part in an interactive in situ double-blind test. The volunteers, drawn from among the attendees, will assess linear modifications on small prey bones, using high-resolution images captured with different microscopy and advanced imaging techniques. The experiment will probe ambiguity in cut mark identification and other linear marks, compare qualitative and quantitative classifications, and gauge consensus on diagnostic criteria. By actively engaging the research community, this initiative aims to foster debate, refine methodologies, and advance the interpretative precision of small-game taphonomy.

DAY 3

BLOCK VI

(PART 1)

SMALL PREY IN THE ARCHAEOLOGICAL RECORD: BIRDS, CARNIVORES, AND MORE

FEATHER, MEAT AND BONE:
SMALL CLUES TO BIG QUESTIONS IN THE PALEOLITHIC RECORD

Monica Gala [1] / **Ivana Fiore** [1] / **Véronique Laroulandie** [2]

1 Sezione di Bioarcheologia, Museo delle Civiltà, Rome, Italy. monica.gala2015@gmail.com

2 PACEA, UMR CNRS 5199, Université de Bordeaux, Ministère de la Culture, Pessac, France.

KEYWORDS
- Taphonomy
- Human–bird interactions
- Middle and Upper Paleolithic
- Italy
- France

ABSTRACT

Although often overlooked in zooarchaeological analyses, bird remains offer valuable insights into Paleolithic lifeways. This study explores human–bird interactions through the analysis of avifaunal assemblages from selected Middle and Upper Paleolithic sites in Italy and France. Through a combination of taxonomic identification, anthropic marks and contextual interpretation, we assess whether birds were targeted for food, feather use, or other purposes. The results suggest diverse exploitation patterns, with both opportunistic and possibly structured behaviors. This comparative approach not only highlights regional specificities but also demonstrates how small and often fragmentary remains can contribute to broader discussions on subsistence strategies, cultural expressions, and human–animal relationships in Paleolithic Europe.

ONE SWALLOW DOES NOT MAKE A SUMMER:

ASSESSING THE ROLE OF SMALL GAME IN THE SUBSISTENCE STRATEGIES OF PRE-NEANDERTHALS AT GRAN DOLINA TD10 (ATAPUERCA)

Antonio Rodríguez-Hidalgo [1, 2] / **Palmira Saladié** [2, 3, 4]

KEYWORDS
- Lower Paleolithic
- Subsistence
- Taphonomy
- Paleoecology
- Diet

1 Instituto de Arqueología-Mérida, Consejo Superior de Investigaciones Científicas (CSIC-Junta de Extremadura), Mérida, Spain & Institut Català de Paleoecologia Humana i Evolució Social (IPHES-CERCA), Tarragona, Spain. ajrh78@gmail.com

2 Institut Català de Paleoecologia Humana i Evolució Social (IPHES-CERCA), Zona Educacional 4, Campus Sescelades URV (Edifici W3), 43007 Tarragona, Spain.

3 Universitat Rovira i Virgili, Departament d'Història i Història de l'Art, Av. de Catalunya 35, 43002 Tarragona, Spain.

4 Departamento de Paleobiología, Unidad Asociada a CSIC, Museo Nacional de Ciencias Naturales, C/ José Gutiérrez Abascal 2, 28006 Madrid, Spain.

ABSTRACT

The systematic exploitation of small prey by human foragers is well documented in the Western Mediterranean Basin during the Upper Paleolithic, and growing evidence points to its regular use during the Middle Paleolithic. In contrast, its scope and nature in the Lower Paleolithic remain poorly understood. Gran Dolina TD10 (Atapuerca, Spain) holds a pivotal position in this debate owing to its well-constrained chronology (Marine Isotope Stages 12–9), extensive stratigraphic sequence with several sublayers, recent large-scale excavations, and the exceptional dataset it provides on pre-Neanderthal paleoecology and behavioral flexibility.

This study presents a taphonomic and zooarchaeological analysis of more than 188,000 faunal remains from subunits TD10.2 to TD10.1, the principal horizons of anthropic occupation. Small-prey diversity is high, with leporids and birds representing a notable proportion of the assemblages in both NISP and MNI; however, bone surface modifications are predominantly attributable to non-human predators. Only a negligible fraction exhibits linear marks of unknown origin, and none display alterations that can be unequivocally attributed to human processing or consumption. These observations suggest that small game did not constitute a regular or secondary resource for the hominins at Gran Dolina. The absence of systematic exploitation is framed here in relation to Optimal Foraging Theory, with consideration given to how technological limitations, occupational patterns, and the influence of non-human predators may have reinforced a preference for high-ranked prey.

BIRD EXPLOITATION BY NEANDERTHALS IN THE FRENCH PYRENEO-MEDITERRANEAN AREA

Thomas Garcia-Fermet [1]

KEYWORDS
- Bird remains
- Neanderthals
- Middle Palaeolithic
- Southern France
- Taphonomy

1 UMR 7194 HNHP, Université de Perpignan Via Domitia, Centre Européen de Recherches Préhistoriques de Tautavel, 66720, Tautavel, France.
thomas665467@gmail.com / thomas.garcia-fermet@univ-perp.fr

ABSTRACT

Taphonomic studies conducted over the last two decades demonstrate that small animals including agile preys (e.g. birds) were part of human diet long before the Upper Palaeolithic. Middle Palaeolithic hominins exploited birds not only for food but also to collect raw material such as feathers or talons, probably used for utilitarian or symbolic purposes. Such practices were not systematic, and more data are needed to clarify their frequency. In this context, we present the results of the taphonomic analysis of avian remains recovered from several Pleistocene cave sites located in the Pyreneo-Mediterranean area, Southern France. Most of the bones were accumulated by non-human predators such as Strigiformes and mammalian carnivores. However, traces of Neanderthal intervention were detected in a majority of localities. Their taxonomic distribution suggests opportunistic bird hunting which reflects prey availability in the local environment. Among the most frequently exploited genera are *Columba, Pyrrhocorax* and *Alectoris*. The case of La Crouzade Cave indicates that birds were hunted for food at least. The hypothesis of feather removal, more difficult to demonstrate, cannot be totally excluded. At Les Ramandils Cave, a cut mark on a large accipitrid talon (Haliaeetus albicilla) suggests an interest in non-edible products. Regarding methodological aspects, skeletal representation and fragmentation are found to be less informative than direct bone surface modification (BSM) observation, due to the mixed origin of the accumulations and the impact of post-depositional processes. The determination of the origin of some traces is still difficult due to equifinality.

BLOCK VI

(PART 2)

SMALL PREY IN THE ARCHAEOLOGICAL RECORD: BIRDS, CARNIVORES, AND MORE

THE LATE GLACIAL IN THE CANSIGLIO PLATEAU:

THE EXPLOITATION OF ALPINE MARMOT AT LANDRO (VENETIAN PREALPS, BELLUNO)

Matteo De Lorenzi [1] / **Nicola Nannini** [2] / **Alessandro Potì** [1] / **Marco Peresani** [1] / **Davide Visentin** [1]

1 Dipartimento di Studi Umanistici, Sezione di Scienze Preistoriche e Antropologiche, Università di Ferrara, Ferrara, Italia. dlrmtt@unife.it

2 MUSE, Museo delle Scienze, Trento, Italia.

KEYWORDS
- Zooarchaeology
- Late Glacial
- Epigravettian
- Small prey
- Northeastern Italy
- Cansiglio Plateau

ABSTRACT

In the last few years, the analysis of some faunal assemblages recorded in the Alpine arch and the Prealpine belt has allowed us to reassess the attraction and the role of Alpine marmot in the subsistence economy of hunter-gatherers during the Late Glacial. During this period, although the foraging system were mostly focused on the exploitation of medium- and large-sized herbivores, marmots became a significant and constantly wanted resource. In this context, the recent excavation and study of Landro, a rocksheltered site with repeated Late Epigravettian occupations, in addition to outlining the ecological and paleoenvironmental framework of the Cansiglio Plateau, offers an insight into the hunting practices and choices of the last Palaeolithic hunter-gatherers. The abundance of marmot bones, resulting in a high number of individuals retaining traces of human exploitation, suggests the interest towards Alpine marmot and an intensive exploitation of its carcasses, finalized both at meat consumption and the utilisation of other resources. Despite its size, the marmot effectively becomes a high-ranked resource in terms of energy return balance, seasonally exploited within a well-established regional mobility system.

THE ALPINE MARMOT (*MARMOTA MARMOTA*): A TAPHONOMIC AND ZOOARCHAEOLOGICAL REVIEW FROM LATE PLEISTOCENE DEPOSITS IN FRANCE AND SPAIN

Philippe Fosse [1] / Pedro Castaños [2] / Evelyne Crégut-Bonnoure [3] / Emmanuel Desclaux [4] / Xabier Murelaga [5] / Cristina Real [6]

KEYWORDS
- Marmota marmota
- Late Pleistocene
- France
- Spain
- Bones
- Geographical distribution
- Taphonomy

1 CNRS, UMR 7269 CNRS LAMPEA, AMU, MMSH, 5 rue du Château de l'Horloge, CS 90412, 13097 Aix-en-Provence cedex 2, France. philippe.fosse@univ-amu.fr

2 Sociedad de Ciencias Aranzadi, Centro Geo-Q, Santimami Auzoa, E-48940 Leioa, Spain.

3 UMR 5608 CNRS TRACES UT2J, Maison de la Recherche, 5 allée Antonio Machado, 31058 Toulouse cedex 9, France.

4 Laboratoire de Préhistoire du Lazaret, Département des Alpes-Maritimes, 33 bis blvd Franck Pilatte, 06300 Nice, France & UMR 7264 CNRS CEPAM UCA, 24 Avenue des Diables Bleues, 06300, Nice, France.

5 Universidad del País Vasco UPV/EHU. Facultad de Ciencia y Tecnología. Dpto. Estratigrafía y Paleontología. Apartado 644, 48080 Bilbao, Spain.

6 Departament de Prehistòria, Arqueologia i Història Antiga, Universitat de València, València, Spain. Grupo de Investigación PREMEDOC.

ABSTRACT

In western Europe, the marmots (*Marmota mesostyla, Marmota (marmota) primigenia, Marmota marmota*) are identified in archaeo-paleontological sequences covering the Middle and Late Pleistocene respectively. To date, there seems to be no taphonomic and zooarchaeological overview for these large rodents.
Based on published (Chaline, 1960 ; Altuna, 1965 ; Villalta, 1972 ; Crégut-Bonnoure, 1995 ; Fosse, 2010 ; Crégut-Bonnoure et al., 2017 ; Philippe et al., 2020 ; Crégut-Bonnoure et al., 2022) and unpublished studies, the spatiotemporal distribution of the alpine marmot (Marmota marmota) is presented for France and Spain, in order to assess its geographical evolution (> 120 deposits) and to address questions relating to its extinction (Latest Pleistocene?). This is followed by a discussion of the taphonomic characterization of marmot remains in fluvial and karst sedimentary contexts (bioturbation, denning). Finally, a review of anthropogenic use of the alpine marmot is briefly presented (specialized hunting sites only in alpine French regions, symbolic use?). Studies on marmot remains might provide comparative data for bone assemblages dominated by other meso-mammals (porcupines, beavers, lagomorphs).

WHAT IS A BIRD?

READING PREHISTORIC BIRDSCAPES IN THE SOUTHERN LEVANT

Linda Amos [1] / **Cheryl Makarewicz** [1]

1 Institute for Prehistoric and Protohistoric Archaeology, University of Kiel, Germany. lamos@ufg.uni-kiel.de

KEYWORDS

- Avian zooarchaeology
- Taphonomy
- Seasonality
- Human-bird interactions
- Natufian
- PPNA
- Southern Levant

ABSTRACT

Prehistoric avian remains are often viewed as environmental proxies, or evidence of human symbolic and subsistence behaviour. However, these perspectives risk overlooking how the abundance, processing, and seasonality of birds reveal prehistoric societies' material, temporal, and conceptual interactions with their environment.

Focusing on the Epipalaeolithic to early Neolithic transition, a period marking the shift between mobile foraging and emerging cultivation, this research draws on two southern Levantine sites with distinct ecological and cultural settings: Natufian el-Wad Terrace (Mount Carmel) and PPNA el-Hemmeh (Wadi Hasa). Both preserve rich avian assemblages with clear taphonomic signatures, allowing comparison across environments, lifeways, and seasonal rhythms.

By examining the ecological and ethological implications of habitat and migration, we investigate how birds appear in the landscape. Taxonomic composition and taphonomic data further illustrate how birds were encountered, selected, and rendered meaningful within these assemblages.

The results highlight avian roles not only in subsistence, but also as temporal markers, valued resources, materials for adornment, and presences carrying emotional or social weight.

Asking "What is a bird?" invites us to look beyond function. By framing bird remains as elements of tangible, lived 'birdscapes', this approach provides new perspectives on the symbolic, temporal, and perceptual dimensions of prehistoric lives.

A SHREW AND A SHREW MAKE A CHALLENGING CLUE:

ACCUMULATION OF SMALL MAMMAL REMAINS IN AN URN FROM THE EARLY IRON AGE CEMETERY AT KONGRESNI TRG (LJUBLJANA, SLOVENIA)

Borut Toškan [1]

1 Research Centre SAZU, Institute of Archaeology, Nov trg 2, 1000 Ljubljana, Slovenia. borut.toskan@zrc-sazu.si

KEYWORDS
- Iron Age
- Funerary
- Practices
- Burial processes
- Barrows
- Micromammals

ABSTRACT

One of the greatest challenges in analysing faunal remains recovered from funerary contexts is distinguishing between deliberately deposited finds/assemblages and those introduced by accidental or natural processes. When such remains can be confidently associated with burials, they are usually interpreted as grave goods, symbolic offerings, afterlife provisions or remains of mortuary feasts and rituals associated with ancestor worship. Animal species with pronounced symbolic or economic significance generally fit well into this interpretative framework. In contrast, the occurrence of so-called 'marginal animal species' such as shrews, moles and voles often cannot be easily explained by these paradigms.

Excavations at the Early Iron Age Kongresni trg cemetery in Ljubljana (Slovenia) revealed a complex burial landscape consisting of several small barrows, each surrounded by a ring ditch and usually containing one to three cremations in the centre of the structure.

Of particular interest is an urn from the 8th to 7th century BC, which was found in a secondary context and contained cremated human bones and the remains of several dozen unburnt small mammal remains. These belonged to at least six different species of shrews, voles and moles. One of the specimens was radiocarbon dated and the result matched the archaeological dating of the urn. Based on the number of specimens, the ethology and habitat requirements of the species represented, and the taphonomic patterns observed, possible factors for the accumulation of the animal remains are discussed, including the prospect that their presence is the result of deliberate human (ritual) act.

REFRAMING MODES OF HUNTING:
INSIGHTS FROM HUMAN BEHAVIORAL ECOLOGY AND ETHNOHISTORY

Eugène Morin [1, 2] / **Bruce Winterhalder** [3] / **Rebecca Bliege Bird** [4] / **Douglas Bird** [4]

KEYWORDS
- Hunting
- Foraging Strategies
- Human Behavioral Ecology
- Foraging Theory
- Endurance Running
- Sweating

1 Trent University, Department of Anthropology, DNA Bldg Block C, 2140 East Bank Drive, Peterborough, Ontario, Canada. eugenemorin@trentu.c

2 Université de Bordeaux, PACEA, Bat. B8, Allée Geoffroy St-Hilaire CS 50023, 33615 Pessac Cedex, France.

3 University of California, Davis, Anthropology & Graduate Group in Ecology, 1 Shields Avenue, CA, 95616, USA.

4 The Pennsylvania State University, Department of Anthropology, 410 Carpenter Building, University Park, PA, 16803, USA.

ABSTRACT

Archaeologists frequently employ models that are heavily informed by ethnographic observations. Because much of this information was collected relatively recently, these models may be strongly influenced by changes linked to the expansion of colonial states, with consequent impacts on animal biomass, prey distribution, procurement strategies, and hunting technology. In this presentation, we compare the efficiency of different hunting strategies and consider their implications for understanding Paleolithic foraging behaviors, as well as the potential impacts of these strategies on hominin physiology. Our findings indicate that two strategies that have received comparatively limited attention in anthropology—communal hunting and persistence hunting—were likely important modes of prey acquisition in the past.

SMALL PREY, BIG INSIGHTS:

UNRAVELING THEIR ROLE IN ARCHAEOLOGY

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