Experiments in the lab and monitored nature: two viewpoints to understand past and present taphonomy and a source of <u>neotaphonomic</u> collections

> Y. Fernández-Jalvo, S. García-Morato, A. Gutiérrez, A. Macho-Callejo

Neotaphonomic collections and associated data: Definition, Management, Training, Conservation 17<sup>тн</sup> -18<sup>тн</sup> Остовег - Ракіз МИНИ

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Lea



**Neotaphonomic collections** allow us to understand taphonomic processes in the past. The identification of diagnostic features recorded on the bone surfaces as well as its histology and chemical composition allow us to extrapolate and identify these processes in fossil sites and forensic contexts. These collections are basic to build a new source of information and may be compared with other collections plus comparison between modern and fossil specimens.



Laboratorio de Ensayos Ambientales y Tafonómicos Laboratory of Environmental Analyses & Taphonomy

#### **VISIT OUR WEB**

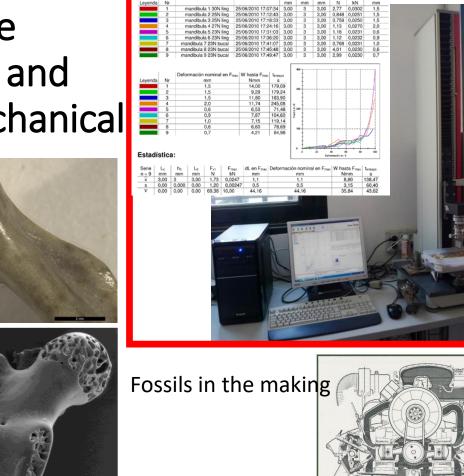
https://www.mncn.csic.es/en/investigaci%C3%B3n/ servicios-cientifico-tecnicos/laboratoryenvironmental-analyses-and-taphonomy-leat

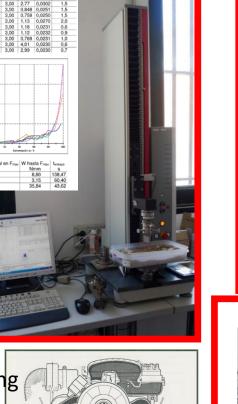


At the Laboratory of Environmental Analyses and Taphonomy (LeaT\_MNCN-CSIC) in combination to the Experimental Field Station of La Higueruela (Toledo\_MNCN-CSIC) and pellet/bone collections we can reproduce controlled environmental conditions to obtain diagnostic traits of specific agents.



Lab experiments are accelerated in time and environmental/mechanical conditions





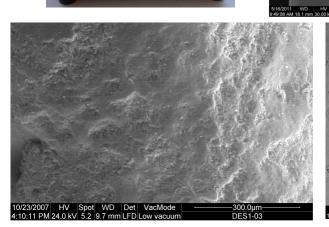




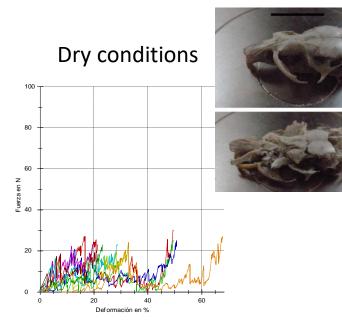


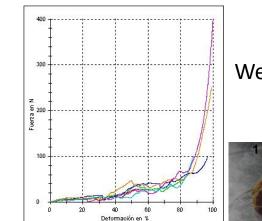


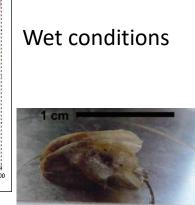




# Compression/abrasion experiments





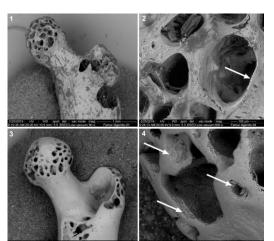




Bone response under identical forces, either dry or wet conditions with different types of water (basic to acid pH) and different substrates (clay-gravel).







FOSSIL BONE



MODERN EXPERIMENTALLY COMPRESSED BONE



# Publications compression



Compressive marks from gravel substrate on vertebrate remains: a preliminary experimental study

M.D. Marín-Monfort<sup>a,\*</sup>, M.D. Pesquero<sup>a,b</sup>, Y. Fernández-Jalvo<sup>a</sup> <sup>a</sup>Museo Nacional de Ciencias Naturales-CSIC, Paleobiolgía, C/ José Gutiérrez Abascal 2, 28006 Madrid, Spain <sup>b</sup>Fundación Conjunto Paleontológico de Tenuel-Dinópolis, Avida. Sogunto s/n, 44002 Teruel, Spain

#### Der Springer Link

#### Published: 21 May 2021

Compression and digestion as agents of vertebral deformation in Sciaenidae, Merlucidae and Gadidae remains: an experimental study to interpret archaeological assemblages

CrossMark

Romina Frontini 🖾, Eufrasia Roselló-Izquierdo, Arturo Morales-Muñiz, Christiane Denys, Émilie Guillaud, Yolanda Fernández-Jalvo & María Dolores Pesquero-Fernández

Journal of Archaeological Method and Theory (2021) Cite this article



Quaternary International

Contents lists available at ScienceDirect



journal homepage: www.elsevier.com/locate/quaint

Very human bears: Wild brown bear neo-taphonomic signature and its equifinality problems in archaeological contexts



Jordi Rosell<sup>a,b,\*</sup>, Ruth Blasco<sup>c</sup>, Maite Arilla<sup>a,b</sup>, Yolanda Fernández-Jalvo<sup>d</sup>

#### quaternary



Article

#### Understanding the Impact of Trampling on Rodent Bones

Yolanda Fernández-Jalvo <sup>1,\*</sup><sup>©</sup>, Lucía Rueda <sup>1,2</sup><sup>®</sup>, Fernando Julian Fernández <sup>3</sup><sup>®</sup>, Sara García-Morato <sup>1,4</sup><sup>®</sup>, María Dolores Marin-Monfort <sup>1,5,6</sup><sup>®</sup>, Claudia Ines Montalvo <sup>7</sup><sup>©</sup>, Rodrigo Tomassini <sup>6</sup><sup>®</sup>, Michael Chazan <sup>8,9</sup><sup>®</sup>, Liora K. Horwitz <sup>10</sup><sup>®</sup> and Peter Andrews <sup>11</sup><sup>®</sup>

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- <sup>2</sup> Sciences de la Vie et de l'Environnement Université de Rennes 1, 35000 Rennes, France
- <sup>3</sup> CONICET-Grupo de Estudios en Arqueometria, Facultad de Ingenieria, Universidad de Buenos Aires (UBA), Av. Paseo Colón 850 (CP C1063ACV), Ciudad Autónoma de Buenos Aires 1063, Argentina; fernandez/Tri@syhoo.com.ar
- <sup>4</sup> Facultad de Ciencias Geológicas, Departamento de Geodinámica, Estratigrafía y Paleontologia, Universidad Complutense de Madrid, Jose Antonio Novais 12, 28040 Madrid, Spain
- <sup>5</sup> Departamento de Botánica y Geologia, Universidad de Valencia, Burjassot, Valencia, 28006 Madrid, Spain

Archaeological and Anthropological Sciences (2021) 13: 215 https://doi.org/10.1007/s12520-021-01466-2

#### ORIGINAL PAPER



Evaluation of size-related salmonid fish vertebrae deformation due to compression: an experimental approach

Arturo Morales Muñiz<sup>1</sup><sup>©</sup> · Romina Frontini<sup>2</sup><sup>©</sup> · Yolanda Fernández-Jalvo<sup>3</sup><sup>©</sup> · Eufrasia Roselló-Izquierdo<sup>1</sup><sup>®</sup> · María Dolores Pesquero-Fernández<sup>3</sup><sup>©</sup> · Alicia B. Hernández<sup>4</sup> · Liliana A. García<sup>5</sup>

Received: 20 August 2021 / Accepted: 20 October 2021 / Published online: 10 November 2021 © The Author(s), under exclusive licence to Springer-Verlag GmbH Germany, part of Springer Nature 2021

#### Abstract



# Publications abrasion

Journal of Taphonomy

PROMETHEUS PRESS/PALAEONTOLOGICAL NETWORK FOUNDATION

2003 Available online at www.journaltaphonomy.co VOLUME 1 (ISSUE 3)

#### **Experimental Effects of Water Abrasion on Bone** Fragments

Yolanda Fernández-Jalvo\* Museo Nacional de Ciencias Naturales (CSIC), Departamento de Paleobiología, José Gutiérrez Abascal 2, 28006-Madrid Spain

Peter Andrews The Natural History Museum, Department of Palaeontology, Cromwell Road, London SW7-5BD, U.K.

> Archaeological and Anthropological Sciences (2019) 11:4891-4907 https://doi.org/10.1007/s12520-019-00834-3

**ORIGINAL PAPER** 



Abrasion in archaeological fish bones from sand dunes. An experimental approach

Romina Frontini<sup>1</sup> · Yolanda Fernández-Jalvo<sup>2</sup> · María Dolores Pesquero Fernández<sup>2</sup> · Rodrigo J. Vecchi<sup>1</sup> · Cristina Bayón<sup>3</sup>

Received: 10 December 2018 / Accepted: 25 March 2019 / Published online: 8 April 2019 C Springer-Verlag GmbH Germany, part of Springer Nature 2019



Disponible en ligne sur www.sciencedirect.com ScienceDirect



http://france.elsevier.com/direct/GEOBIO

Original article

Experimental taphonomy in museums: Preparation protocols for skeletons and fossil vertebrates under the scanning electron microscopy

Yolanda Fernández-Jalvo<sup>a,\*</sup>, Maria Dolores Marín Monfort<sup>b,c</sup>

Geobios 41 (2008) 157-181

#### \_ethaia

#### Digestion versus abrasion features in rodent bones

YOLANDA FERNÁNDEZ-JALVO, PETER ANDREWS, PALOMA SEVILLA AND VIRGINIA REQUEJO

#### LETHAIA

Fernández-Jalvo, Y., Andrews, P., Sevilla, P. & Requejo, V. 2014: Digestion vs. abrasion features in rodent bones. Lethaia, Vol. 47, pp. 323-336.

The origin of most fossil small mammal assemblages is predation by avian or mammalian predators. Bone corrosion by gastric juices observed in these fossils is direct evidence of digestion, and traits of digestion indicate the type of predator involved. However, certain features observed in digested bones, such as rounding and polishing, are similar to the rounding and polishing produced by other processes, particularly



Rolling bones: A preliminary study of micromammal abrasion on different initial taphonomic stages

Sara García-Morato, María Dolores Marin-Monfort, and Yolanda Fernández-Jalvo

#### ABSTRACT

The identification of transport process is key to interpret the palaeoecology, the dating and the site formation. Apart from dispersal and size/shape selection, bone

#### Quaternary International 481 (2018) 3-13



Characterization of recent marks produced on fossil bone surface during sullegic and trephic processes and their influence on taphonomic studies

CrossMark

M.D. Marin-Monfort <sup>a, b, \*</sup>, M. Suñer <sup>b, c</sup>, Y. Fernández-Jalvo <sup>a</sup>

# All experiments in lab need validation by monitoring the nature

#### GLOBAL WEATHERING PROJECT



Taphonomic field station

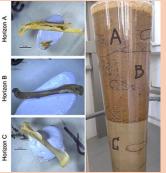


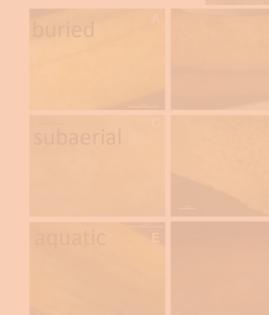




#### LA HIGUERUELA EXPERIMENTAL FIELD STATION







o cite this article: Alba Macho-Callejo, Sara Garcia-Morato, Aida Gutiérrez, Dores Iarin-Monfort & Yolanda Fernández-Jalvo (06 Oct 2023): Put down roots and find the Iant: preliminary results of root etching and its implications, Historical Biology, DOI: 0.1080/08912963.2023.2263865

To link to this article: <a href="https://doi.org/10.1080/08912963.2023.2263865">https://doi.org/10.1080/08912963.2023.2263865</a>

# LA HIGUERUELA EXPERIMENTAL FIELD STATION





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**Historical Biology Historical Biology** An International Journal of Paleobiology ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/ghbi20

> Put down roots and find the plant!: preliminary results of root etching and its implications

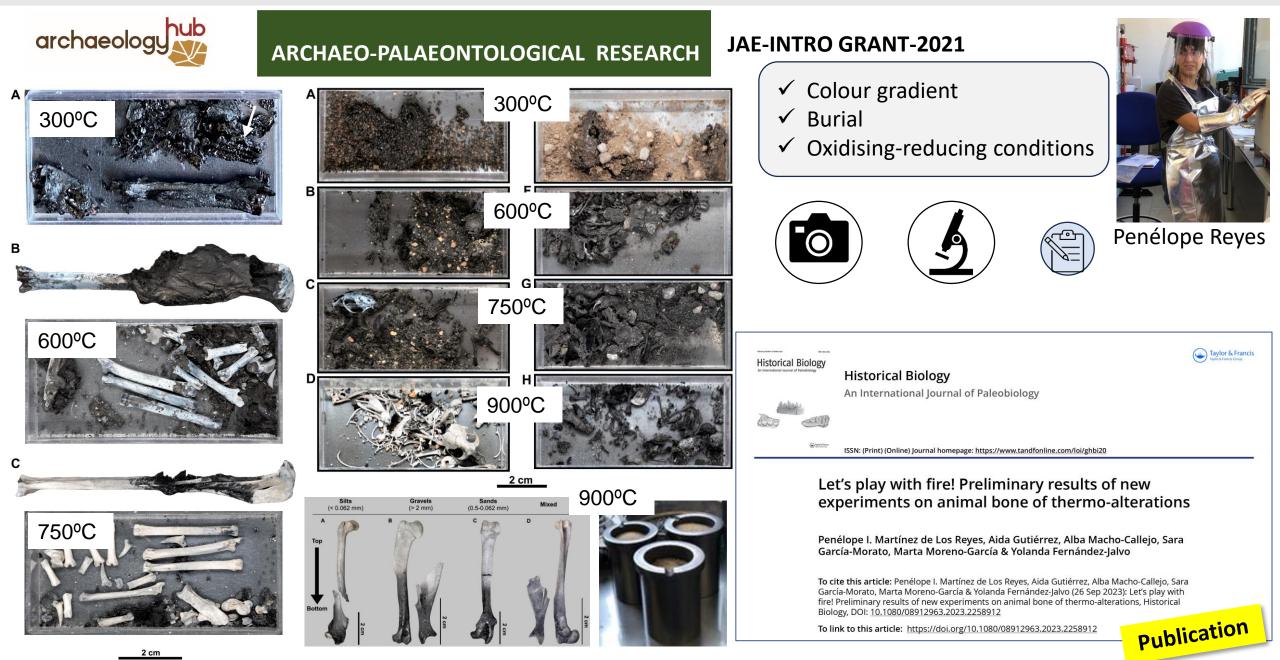
Taylor & Francis

Alba Macho-Callejo Sara García-Morato, Aida Gutiérrez, Dores Marin-Monfort & Yolanda Fernández-Jalvo

To cite this article: Alba Macho-Callejo, Sara García-Morato, Aida Gutiérrez, Dores Marin-Monfort & Yolanda Fernández-Jalvo (06 Oct 2023): Put down roots and find the Publication plant!: preliminary results of root etching and its implications, Historical Biology, DOU 10.1080/08912963.2023.2263865

To link to this article: https://doi.org/10.1080/08912963.2023.2263865

#### January-June, 2022



### <image>TRAINING STUDENTS FROM UNIVERSITIES TRAINING STUDENTS FROM UNIVERSITIES Pellet collection assistance Count & ID skeletal elements Assistance to experiments Photographing taph-modifications Microscope training

Students from the University (Complutense and Autonoma) come to the LeaT to do volunteer work opening pellets, photographing or lab assistance to gain experience.









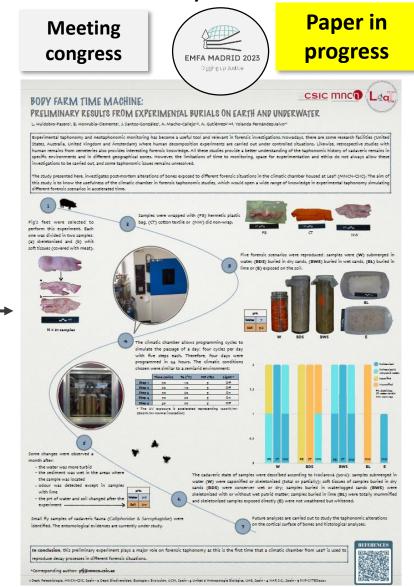


#### FORENSIC RESEARCH

#### Laboratory practices with students of professional training in Pathological Anatomy and Cytodiagnosis (Institute Claudio Galeno)

To analyse the earliest taphonomic modifications of bodies wrapped or not in plastic bags or cotton textile and submerged in water or buried





## **BUSINESS AND HEALTH**



### **BUSINESS AND HEALTH**

October to October, 2022-2023



#### **PRIVATE COMPANY**

"Programa Investigo" project of the Regional Community of Madrid and the LeaT-MNCN-CSIC.

Ageing of materials in climatic chamber

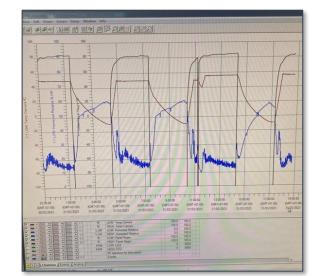


L'Oreal recycled and non-recycled packaging

VO prosthetic

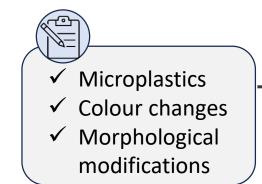
UNYQ prosthetic materials







Environmentally friendly soaps and recycled packaging "Jabones Beltrán"





### **ABRASIVE TEST**



# **CORROSION TEST**

February-April, 2023



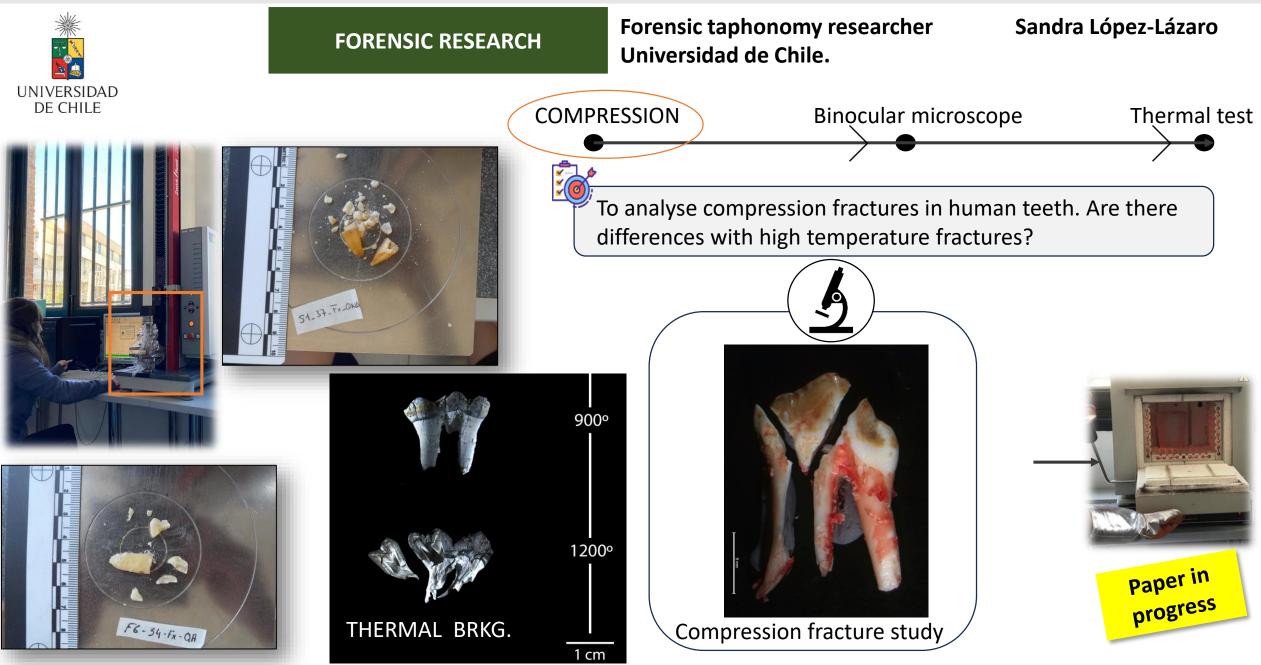
#### PALAEONTOLOGICAL RESEARCH

TaphEN – IPHES (Spain)

Taxonomic identification of *Meriones* affected by digestion of diurnal and nocturnal raptors

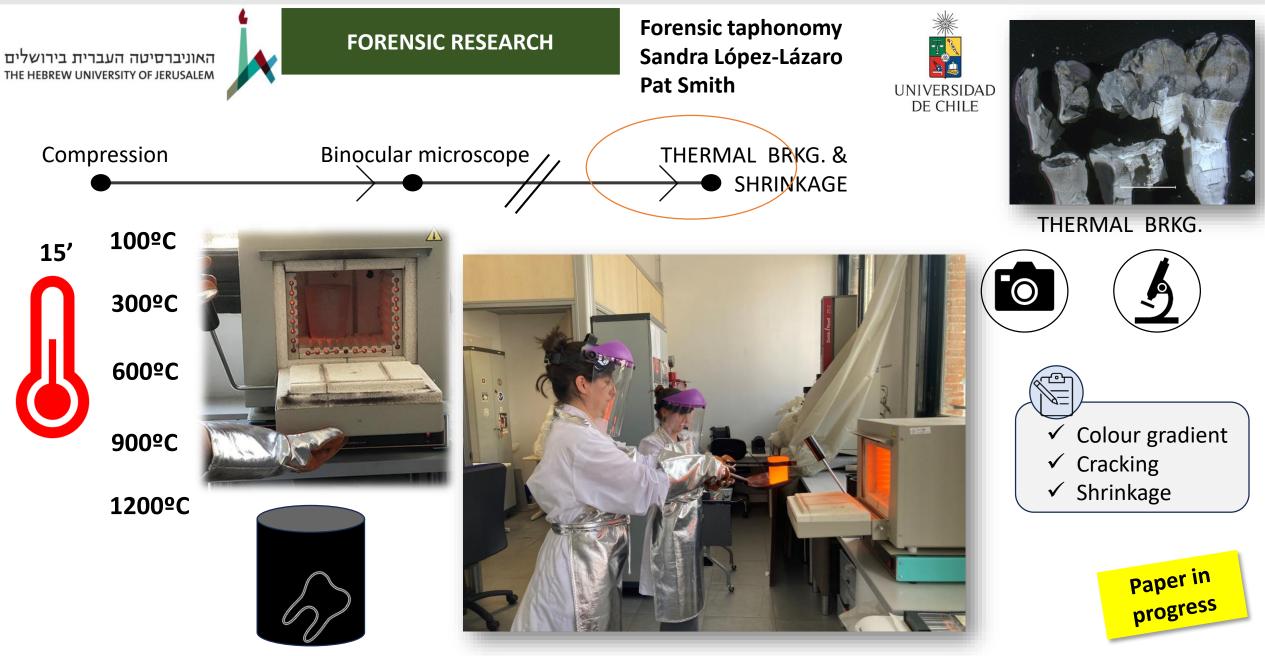


### **MECHANICAL TEST**



## THERMAL TEST

#### February and July, 2022-2023



LeaT has adapted a space for analyses and consultation of experimental and monitored collections

da

### **PELLET COLLECTION**

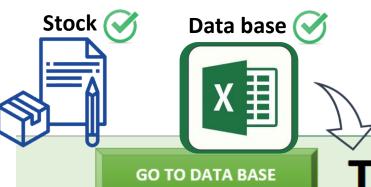


### **NEOTAPHONOMIC COLLECTION**

Lab and field experiments as well as specimens monitored/collected from nature need to be stored, curated and be well organized.



#### **TAPHONOMIC COLLECTION**

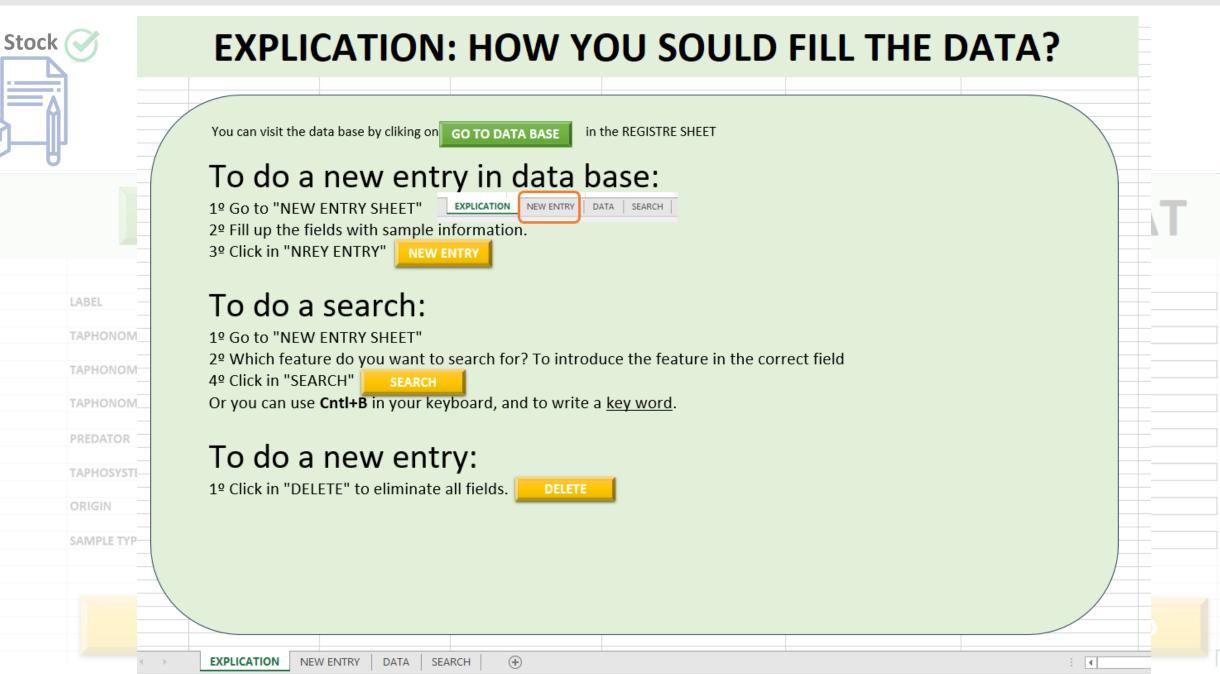


# What information is included in the LeaT's taphonomic collection database?

# **TAPHONOMIC COLLECTION OF LEAT**

DELET	ТЕ	SEARCH	NEW ENTR
SAMPLE TYPE		ANALYSIS	
ORIGIN		REMARKS	
TAPHOSYSTEM		STORAGE CABINET	
PREDATOR		MORE INFO	
TAPHONOMIC PROCESS		PAPER	
TAPHONOMIC AGENT		COORDINATES	
TAPHONOMIC ALTERATION		LOCALITY	
LABEL		ТАХА	

### **TAPHONOMIC COLLECTION**



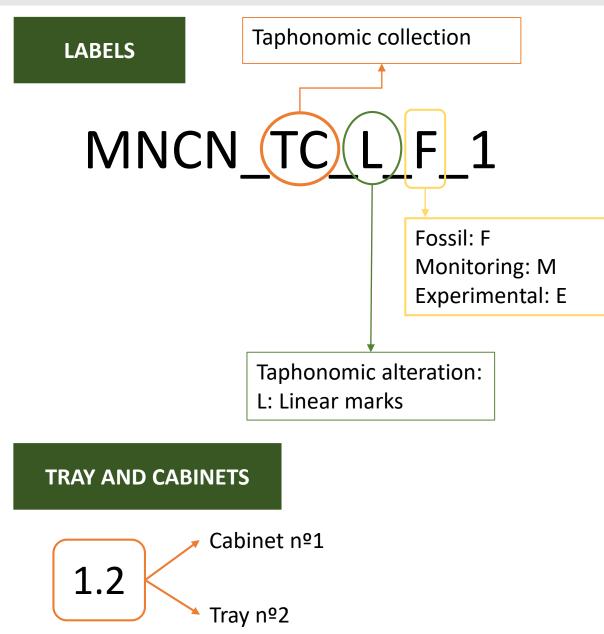
#### **TAPHONOMIC COLLECTION**

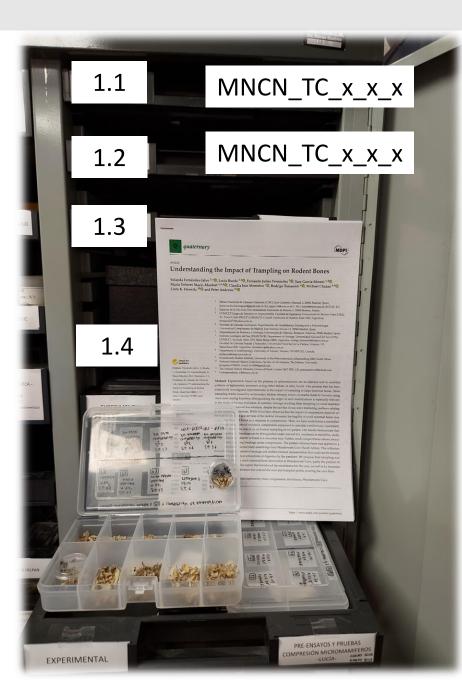
A	B	C	D	E	F	G	DAT
LABEL	TAPHONOMIC ALTERATION	TAPHONOMIC AGENT	TAPHONOMIC PROCESS	PREDATOR	TAPHOSYSTEM	ORIGIN	SAMPLE TYPE
Egagropila E5 Control (insolacion) - Mandibula	Referencia					M	Micro
Egagropila E6 Control (insolacion) - Mandibula	Referencia					М	Micro
Caja Herpeto	Meteorizacion					М	Micro
Caja 1 - control herpeto	Meteorizacion					М	Micro
E25 egagropila control (insolacion)	Meteorizacion					М	Micro
E22 egagropila control (insolacion)	Meteorizacion					М	Micro
E23 egagropila control (insolacion)	Meteorizacion					М	Micro
Polen ALDER A - 1	Ensayo climatico					E	Polen
Polen ALDER A - 2	Ensayo climatico					E	Polen
Polen ALDER A - 3	Ensayo climatico					E	Polen
Polen ALDER A - 4	Ensayo climatico					E	Polen
Polen ALDER A - 5	Ensayo climatico					E	Polen
n Li Morni i c	e to co					-	n. 1

### DATA BASE

SAMPLE TYPE	TAXA	LOCALITY	COORDINAT	PAPER	MORE INFO	STORAGE CABI	REMARKS	ANALYSIS
Micro					Bolsa con tubo en su interior con muestra. No pone fecha	1.1	In situ	
Micro					Bolsa con tubo en su interior con muestra. No pone fecha	1.1	In situ	
Micro					Muestras de micro dentro de caja de plastico transparente dentro de caja pequeña de cartor	1.1	In situ	
Micro					Muestras de micro dentro de una caja de plastico transparente, dentro de una caja pequeña	1.1	In situ	
Micro					Bolsa que contiene metapodos, Radios, Ulnas y Mandibulas; dentro de caja Weathering	1.1	In situ	
Micro					Bolsa que contiene Radios, Mandibulas, Metapodos, Tibias, Ulnas y Costillas; dentro de caja	1.1	In situ	
Micro					Bolsa que contiene Femur y Tibias; dentro de caja Weathering	1.1	In situ	
Polen				No publicado	Polen bajo condicion climatica desierto con sol	1.2	In situ	
Polen				No publicado	Polen bajo condicion climatica desierto sin sol	1.2	In situ	
Polen				No publicado	Polen bajo condicion experimental inoculacion de CO2	1.2	In situ	
Polen				No publicado	Polen bajo condicion experimental inoculacion de CO2	1.2	In situ	
Polen				No publicado	Polen bajo condicion experimental inoculacion de CO2	1.2	In situ	
Polen				No publicado	Polen bajo condicion experimental inoculacion de CO2	1.2	In situ	
Polen				No publicado	La muestra no essta o esta desplazada	1.2	Missing	
Polen				No publicado	La muestra no esta o esta desplazada	1.2	Missing	
Polen				No publicado	Polen bajo condicion experimental inoculacion de CO2	1.2	In situ	
Polen				No publicado	Polen haio condicion climatica experimental sol en camara	12	In situ	

### **NEOTAPHONOMIC COLLECTION**





# NEOTAPHONOMIC COLLECTIONS IN DISSCO

ONCE THE EUROPEAN **SYNTHESYS** PROGRAM FINISHED, **DISSCO** BECOMES THE NEW INITIATIVE OF THE EUROPEAN MUSEUMS' CONSORTIUM



• The Distributed System of Scientific Collections (DiSSCo) is a new worldclass Research Infrastructure (RI) for Natural Science Collections. It aims to <u>digitally unify</u> all European natural science assets under one European collection featuring common access, curation, policies and practices, while ensuring that all the data is easily Findable