Animal Bones and Archaeology

Guidelines for Best Practice

Supplement 1: Key reference resources
# Contents

**Preface** ................................................................................................................ 2

**S1.1 Comparative assemblage resources** ....................................................... 3  
Regional reviews of animal bone data ............................................................... 3  
Online zooarchaeological datasets ................................................................. 3  

**S1.2 Species biogeography and zoology** ..................................................... 3  
Species biogeography ....................................................................................... 3  
Online zoological guides to species ................................................................. 3  

**S1.3 Zooarchaeological methods and conventions** ................................... 4  
General zooarchaeological texts (including quantification) ......................... 4  
Published bone inventory/recording databases and spreadsheets ............... 4  
Zone conventions .............................................................................................. 4  
Age at death ...................................................................................................... 4  
Standard biometric conventions ................................................................... 5  
Withers heights conversion factors ................................................................. 5  
Palaeopathology ................................................................................................. 5  
Taphonomy ......................................................................................................... 6  
Butchery ............................................................................................................ 6  

**S1.4 Identification resources** .................................................................... 7  
Virtual comparative collections ..................................................................... 7  
Identification guides: amphibian and reptile remains .................................. 7  
Identification guides: bird remains ................................................................. 7  
Identification guides: fish remains ................................................................. 8  
Identification guides: mammal remains ....................................................... 8  

---

**Preface**  
Additional contributors and acknowledgements are provided in the main document.
S1.1 Comparative assemblage resources

**Regional reviews of animal bone data**


Holmes, M forthcoming ‘Southern England: A review of animal remains from Saxon, medieval and post-medieval archaeological sites [dataset]’. Portsmouth: English Heritage


Serjeantson, D 2011b A Review of Animal Remains from the Neolithic and Early Bronze Age of Southern Britain [Dataset]. York: Archaeology Data Service [Distributor], doi:10.5284/1000396


**Online zooarchaeological datasets**


Dama International: Fallow Deer Project nd Zooarchaeology @ Nottingham Deer Bone Database [Dataset]. http://www.nottingham.ac.uk/zooarchaeology/deer_bone/search.php, accessed May 2014

Grimm, J 2008 WAMAP: Wessex Archaeology Metric Archive Project [Dataset]. York: Archaeology Data Service [Distributor], doi:10.5284/1000043

University of Southampton 2003 Animal Bone Metrical Archive Project (ABMAP) [Dataset]. York: Archaeology Data Service [Distributor], doi:10.5284/1000350

University of York 2008 Environmental Archaeology Bibliography (EAB) [Dataset]. York: Archaeology Data Service [Distributor], doi:10.5284/1000225

S1.2 Species biogeography and zoology

**Species biogeography**


Yalden, D W 1999 The History of British Mammals. London: Poyser Natural History


**Online zoological guides to species**


S1.3 Zooarchaeological methods and conventions

General zooarchaeological texts (including quantification)

Lyman, R I 2008 *Quantitative Palaeozoology*. Cambridge: Cambridge University Press


Serjeantson, D 2009 *Birds*. Cambridge: Cambridge University Press


Published bone inventory/recording databases and spreadsheets


Zone conventions


Watson, J P N 1972 ‘Fragmentation analysis of animal bone samples from archaeological sites’. *Archaeometry* 14, 221–7

Age at death
Tooth development


Carter, R J 1997 ‘Age estimation of the roe deer (Capreolus capreolus) mandibles from the Mesolithic site of Star Carr, Yorkshire, based on radiographs of mandibular tooth development’. *Journal of Zoology* 241, 495–502

Carter, R J 1998 ‘Reassessement of seasonality at the early Mesolithic site of Star Carr, Yorkshire based on radiographs of mandibular tooth development in red deer (Cervus elaphus)’. *Journal of Archaeological Science* 25, 851–6


Tooth eruption and wear
Brown, G T 1913 *Dentition as Indicative of the Age of Animals of the Farm*, 6th edn. London: John Murray


Jones, G G and Sadler, P 2012 ‘Age at death in cattle: Methods, older cattle and known age reference material’. *Environmental Archaeology* 17, 11–28
of known age, sex, castration status and variation in unimproved Shetland sheep of epiphyseal fusion and morphometric


Storå, J 2000 'Skeletal development in the grey seal Halichoerus grypus, the ringed seal Phoca hispida botnica, the harbour seal Phoca vitulina vitulina and the harp seal Phoca groenlandica. Epiphysial fusion and life history'. Archaeozooologia 11, 199–222

Zeder, M 2006 'Reconciling rates of long bone fusion and tooth eruption and wear in sheep (Ovis) and goat (Capra)', in Ruscello, D (ed) Recent Advances in Ageing and Sexing Animal Bones. Oxford: Oxbow Books, 87–118

Standard biometric conventions


Morales, A and Rosenlund, K 1979 Fish Bone Measurements. Copenhagen: Steenstrupia

Payne, S and Bull, G 1988 'Components of variation in measurements of pig bones and teeth and the use of measurements to distinguish wild from domestic pig remains'. Archaeozooologia 2, 27–66


Withers heights conversion factors

Various species

von den Driesch, A and Boesneck, J 1974 'Kritische Anmerkungen zur Widerristhöhenberechnung aus Längenmassen vor- und frühgeschichtlicher Tierknochen'. Säugetierkundliche Mitteilungen 22, 325–48

Cattle

Foch, J 1966 'Metrische Untersuchungen an Metapoden einiger europäischer Rinderrassen'. Unpublished dissertation, University of Munich


Sheep


Pigs

May, E, Teichert, M and Hannemann, K 1996 'Allometric aspects to the determination of the withers height in pigs on the basis of the data of M. Teichert'. Anthropozooologica 8, 125–39

Teichert, M 1969 'Osteometrische Untersuchungen zur Berechnung der Widerristhöhe bei vor- und frügeschichtlichen Schweinen'. Kühn-Archiv 83, 237–92

Horses

May, E 1985 'Widerristhöhe und Langknochenmasse bei Pferd – ein immer noch aktuelles Problem'. Zeitschrift für Saugetierkunde 50, 368–82

Dogs

Clarke, K M 1995 'The later prehistoric and protohistoric dog: The emergence of canine diversity'. Archaeozooologia 2, 9–32

Harcourt, R A 1974 'The dog in prehistoric and early historic Britain' Journal of Archaeological Science 1, 151–75

Palaeopathology

General texts


Miles, A E W and Grigson, C 1990 Colyer's Variations and Diseases of the Teeth of Animals, revised edn. Cambridge: Cambridge University Press

General recording guides


Vann, S and Thomas, R 2006 ‘Humans, other animals and disease: A comparative approach towards the development of a standardised recording protocol for animal palaeopathology’. Internet Archaeology 20, http://dx.doi.org/10.11141/ia.20.5

Dental recording guides

Dobney, K, Ervy, N and La Ferla, B 2002 ‘Assessment and further development of the recording and interpretation of linear enamel hypoplasia in archaeological pig populations’. Environmental Archaeology 7, 35–46


Joint disease recording guides


Thomas, R and Johannsen, N 2011 ‘Articular depressions in domestic cattle phalanges and their archaeological relevance’. International Journal of Paleopathology 1, 43–54

Taphonomy
General introduction

Denys, C 2002 ‘Taphonomy and experimentation’. Archaeometry 44, 469–84

Lyman, R L 1994 Vertebrate Taphonomy. Cambridge: Cambridge University Press

Tooth marks and digestion


Pobiner, B 2008 ‘Paleoecological information in predator tooth marks’. Journal of Taphonomy 6, 373–97

Bone weathering


Bone diagenesis


Accumulation processes

Butchery


Dominguez-Rodrigo, M 2008 ‘Conceptual premises in experimental design and their bearing on the use of analogy: An example from experiments on cut marks’. World Archaeology 40, 67–82


S1.4 Identification resources

Virtual comparative collections

All classes


Birds

Aves3D 2011 http://aves3d.org/, accessed May 2104

Fish


University of Nottingham, Department of Archaeology 2011 Archaeological Fish Resource. http://fishbone.nottingham.ac.uk/index.aspx, accessed May 2014

Identification guides: amphibian and reptile remains


Glastra, R 1980 Osteologische Determinatie van de Inheemse Herpetofauna: Handleiding bij de Hepetologische Vergelijkingsscollectie van het IPP. Amsterdam: Albert Egges van Giffen Instituut voor Prae-en Protohistorie

Identification guides: bird remains


Tomek, T and Bochenški, Z M 2009 A Key for the Identification of Domestic Bird Bones in Europe: Galliformes and Columbiformes. Kraków: Institute of Systematics and Evolution of Animals, Polish Academy of Sciences


Guides to distinguishing morphologically similar bird species

Galliforms


MacDonald, K 1992 ‘The domestic chicken (Gallus gallus) in sub-Saharan Africa: A background to its introduction and its osteological differentiation from indigenous fowls (Numidinae and Francolimus sp.’). Journal of Archaeological Science 19, 303–18

Tomek, T and Bochenški, Z M 2009 A Key for the Identification of Domestic Bird Bones in Europe: Galliformes and Columbiformes. Kraków: Institute of Systematics and Evolution of Animals, Polish Academy of Sciences

Columbids

Identification guides: mammal remains

Tomek, T and Bocheński, Z M 2009 A Key for the Identification of Domestic Bird Bones in Europe: Galliformes and Columbiformes. Kraków: Institute of Systematics and Evolution of Animals, Polish Academy of Sciences

Tomek, T and Bocheński, Z M 2000 The Comparative Osteology of European Corvids (Aves: Corvidae), with a Key to the Identification of their Skeletal Elements. Kraków: Institute of Systematics and Evolution of Animals, Polish Academy of Sciences

Identification guides: fish remains


Identification guides: mammal remains

Hillson, S 1999 Mammal Bones and Teeth, revised edn. London: University College London


Neonatal mammals


Guides to distinguishing morphologically similar mammal species

Sheep and goats

Boesneck, J 1969 ‘Osteological differences between sheep (Ovis aries Linné) and goat (Capra hircus Linné)’, in Brothwell, D R and Higgs, E S (eds) Science in Archaeology: A Comprehensive Survey of Progress and Research. London: Thames and Hudson, 331–58

Halstead, P and Collins, P 2002 ‘Sorting the sheep from the goats: Morphological distinctions between the mandibles and mandibular teeth of adult Ovis and Capra’. Journal of Archaeological Science 29, 545–53


Payne, S 1985 ‘Morphological distinctions between the mandibular teeth of young sheep, Ovis, and goats, Capra’. Journal of Archaeological Science 12, 139–47


Equids

Davis, S J M 1980 ‘Late Pleistocene and Holocene equid remains from Israel’. Zoological Journal of the Linnean Society 70, 289–312


Large mammals
Brown, C L and Gustafson, C E 1979 A Key to Postcranial Skeletal Remains of Cattle/Bison, Elk and Horse. Reports of Investigations 57. Pullman: Laboratory of Anthropology, Washington State University

Deer
Lister, A 1996 'The morphological distinction between bones and teeth of fallow deer (Dama dama) and red deer (Cervus elaphus)'. *International Journal of Osteoarchaeology* 6, 119–43


Dogs and wolves
Pluskowski, A 2006 'Where are the wolves? Investigating the scarcity of European grey wolf (Canis lupus lupus) remains in medieval archaeological contexts and its implications'. *International Journal of Osteoarchaeology* 16, 279–95

Rabbits and hares

Small mammals
Harris, S and Yalden, D W (eds) 2008 *Handbook of British Mammals*, 4th edn. Southampton: The Mammal Society


Yalden, D W 1977 *The Identification of Remains in Owl Pellets*. Reading: Mammal Society

Seals
English Heritage is the Government’s statutory advisor on the historic environment. English Heritage provides expert advice to the Government on all matters relating to the historic environment and its conservation.

For further information and copies of this leaflet, quoting the Product Code, please contact:

English Heritage
Customer Services Department
Swindon SN2 2EH
Telephone: +44 (0)870 333 1181
Email: customers@english-heritage.org.uk

If you would like this document in a different format, please contact our Customer Services Department:
Telephone: +44 (0)870 333 1181
Fax: +44 (0)179 341 4926
Textphone: +44 (0)179 341 4878
Email: customers@english-heritage.org.uk

Published date October 2014
© English Heritage
Copy-edited by Eva Fairnell
Designed by John Vallender

Product Code 51928