
Hunting marmots on the Alps during the Late Glacial: experimental data and 3D morphometric analysis of projectile impact marks on bone

Rossella Duches*^{†1}, Nicola Nannini^{1,2}, Alex Fontana¹, Francesco Boschin³, Jacopo Crezzini³, Matteo Romandini^{2,4}, and Marco Peresani²

¹MUSE - Museo delle Scienze (MUSE) – Corso del Lavoro e della Scienza 3, IT 38123, Trento, Italie

²Università degli Studi di Ferrara, Dipartimento di Studi Umanistici, Sezione di Scienze Preistoriche e Antropologiche – Corso Ercole I d' Este 32, IT 44121, Ferrara, Italie

³Università degli Studi di Siena, Dipartimento di Scienze Fisiche, della Terra e dell'Ambiente, UR Preistoria e Antropologia – Via Laterina 8, IT 53100, Siena, Italie

⁴University of Bologna, Department of Cultural Heritage – Via degli Ariani 1, 48121 Ravenna, Italie

Résumé

Despite the widespread application of high-resolution quantitative methods in bone taphonomy, very few studies have focused on projectile impact marks (PIMs). Therefore, in a previous work, we explored the potential of 3D microscopy in distinguishing bone hunting injuries from other taphonomic marks, developing a widely-applicable diagnostic framework based on experimental data and focused on Late Epigravettian projectiles (Duches et al. 2016). Even though we confirmed the validity of the method on zooarchaeological remains of medium size mammals (Nannini et al. submitted), the reliability of the experimental record in relation to smaller animals needed more tests and verifications: bones dimension and thickness could indeed affect their resistance to projectile impacts, influencing the morphometry of hunting injuries and the representativeness of PIM classes. In this regard, Late Glacial sites of north-eastern Italy interpreted as specialized marmots hunting camps represent an optimal case-study. Thousands of marmot bones from Grotte Verdi di Pradis, for instance, testify the exploitation of a minimum of 571 individuals, representing the 98.8% of the whole faunistic assemblage. In order to be as coherent as possible to archaeological data, the ballistic experiment involved 8 fresh coypus (*Myocastor coypus*) carcasses, shot by 130 Late Epigravettian arrows equipped with backed points and bladelets. Since only one puncture mark has been produced in front of a very high number of impact fractures and drags, the results confirm the affection of PIM class representativeness by bones dimension and thickness. If the application of 3D microanalysis in examining different taphonomic marks have proved that only punctures and drags are diagnostic of impact (Duches et al. 2016), this new experimentation established that only drag marks are relevant for the identification of PIMs on small mammals zooarchaeological remains. On the contrary, the general consistency of the morphometric data of experimental drags obtained on medium size mammals and the ones on coypus, state that the features of this PIM are generally not influenced by bones size and thickness. 3D measurements, processed through statistic, state in fact that several drags morphometric parameters - such as depth of cut, breadth at the top of the cut, breadth at

*Intervenant

[†]Auteur correspondant: rossella.duches@muse.it

the floor of the cut, opening angle and RTF index (ratio between the breadth at the top and the breadth at the floor) - are consistent in both the experimentations and significantly different from that of cut-marks. Using the experimental results for the interpretation of archaeological marks found on Pradis remains, we could identify with certainty 9 drags on marmot bones. This result confirms the Epigravettian predation of alpine marmots using bow and arrow and enriches the current debate on the hunting of small preys during the Late Glacial.

Duches, R., Nannini N., Romandini M., Boschin F., Crezzini J., Peresani M., 2016. Identification of Late Epigravettian hunting injuries: Descriptive and 3D analysis of experimental projectile impact marks on bone. *Journal of Archaeological Science* 66: 88-102.

Nannini N., Duches, R., Fontana A., Boschin F., Crezzini J., Bernardini F., Tuniz C., Dalmeri G., submitted. Archaeological bone injuries by lithic backed projectiles: new evidence from the Late Epigravettian site of Cornafessa rock shelter (Italy).

Mots-Clés: Bone Taphonomy, Projectile impact marks, Hunting, Ballistics, Late Epigravettian, Late Glacial, Italy