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From feathers to food: Reconstructing the complete exploitation of avifaunal resources by Neanderthals at Fumane cave, unit A9

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ABSTRACT

The avifaunal assemblage from unit A9 of Grotta di Fumane provides clear evidence of the human consumption of birds and contributes to an understanding of the role of avifaunal resources in the subsistence strategies of Middle Palaeolithic hominids. In the course of these analyses, some new species of birds were identified along with the most common species already recorded in other cultural layers of Fumane. The exploitation of these resources is testified by taphonomic indicators, which are recognized on 6.5% of the total assemblage, and by a non-random spatial relationship among the bone elements, the morphology of the cave and the hearths. Further, evidence for the exploitation of feathers from various raptors and other birds backdates, although by a few millennia, the acquisition of valuable elements of avian plumage, strengthening the growing body of data that demonstrates the appearance of modern behavior in extinct autochthonous populations of Europe well before the immigration of modern humans.

1. Introduction

Investigations into hominin diets, specifically those of the Neanderthals, ineluctably feed into debates that revolve around the presumed capabilities, or lack thereof, of these hominins in the exploitation of small game as a food resource (Stiner, 2001; Stiner and Munro, 2002; Hockett and Haws, 2009). Nevertheless, multiple data have induced some authors to suggest that the exploitation of small animals has been important for human subsistence since ca. 250 ka (Klein and Scott, 1986; Stiner, 2005). The subject becomes increasingly interesting when the associated zooarchaeological evidence pre-dates the arrival of Anatomically Modern Humans in Europe and in the Mediterranean Basin, which thus implies an independent origin for such changes in subsistence strategies. Regardless of the growing amount of zooarchaeological and taphonomical data, however, reliable indicators of bird exploitation by Middle Palaeolithic humans are still far from demonstrating that the acquisition and consumption of avifaunal game was regularly practiced. Traces of these sporadic behaviors date back to the Early Pleistocene, at Sima del Elefante in Spain (Huguet, 2007), Dursunlu in Turkey (Güleç et al., 2009), and in more recent times in France at Lazaret (Lumley et al., 2004), La Baume de Gigny (Mourer-Chauviré, 1989) and Grotte de l'Hortus (Mourer-Chauviré, 1972), although the latter was inferred only on a statistical basis. Bolomor Cave, Spain, has produced repeated, remarkable evidence related to the consumption of birds, throughout the entire stratigraphic sequence from Levels XVIIc to IV, which are dated from MIS9 to 5e, respectively. Here, numerous anthropic traces, including cut-marks, burning patterns, and human toothmarks on both leg and wing bones have been considered diagnostic elements in suggesting the acquisition and food use of quick-flying and other bird types (Blasco and Fernández Peris, 2009, 2012; Blasco et al., 2010). Again in the Iberian peninsula, Neanderthals also exploited rock dove for food in a non-casual or sporadic way over a span of thousands of years at Gorham's Cave (Blasco et al., 2014).

Beyond utilitarian purposes, scanty but increasing evidence of the interaction between raptors and hominins during the Middle Palaeolithic has also been recorded across a vast area, from Europe to the Levant. Taphonomic analyses suggest that Late Pleistocene Neanderthals were mostly focused on black-feathered birds and birds of prey of different sizes for the specific selection of wings, plumage, and talons, which suggests the symbolic use of particular

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parts of the body. Relevant cases of cut-marked medium and large-sized raptors, in association with other birds (i.e. Alpine chough) processed for the same purpose, have been described in Italy at Grotta del Rio Secco (Romandini et al., 2014a) and Grotta Fumane (Fiore et al., 2004; Peresani et al., 2011), in Croatia at Krapina (Radovčić et al., 2015), in France at Pech de l'Azé I (Soressi et al., 2008) and IV (Dibble et al., 2009), Baume de Gigny (Mourer-Chauviré, 1989), Combe-Grenal and Les Fieux (Morin and Laroulandie, 2012), Grotte Mandrin (Romandini et al., 2014a), and at Gibraltar (Finlayson et al., 2012), and the data from these sites reveal a certain convergence of such selections.

Despite this ensemble of evidence, little is yet known about how the acquisition of birds, butchering processes in relation to successive consumption, and other activities fits into the Neanderthal subsistence cycles in the regions concerned. From the above listed, it is clear that knowledge about human ecology in the Late Pleistocene is advanced through the acquisition of diverse data from multiple sources on the consumption of small prey. This advancement is here proposed through the results of the avifaunal assemblage analysis from Mousterian unit A9 at Fumane cave in northern Italy, which are discussed in the framework of late Neanderthal behavior.

2. The archaeological and zooarchaeological context at Fumane

Fumane cave is located at 350 m asl in the western Monti Lessini, a fan-shaped plateau dipping gently to the south towards the alluvial plain of the Adige River and bound in the north by peaks ranging from 1500 to 1600 m asl. To the west, the plateau ends at the Adige Valley, a long and deep cut connecting the inner alpine region with the Po Plain. The immediate surroundings of the cave include several tectonic terraces that are connected to the bottom of the Fumane valley by steep slopes and rock walls. The cave has produced a finely layered late Middle and Early Upper Palaeolithic sequence with Mousterian, Uluzzian, and Aurignacian levels (Broglio et al., 2006; Peresani et al., 2008, in press; Peresani, 2012).

Besides in the final Mousterian stratigraphic complex A5–A6 (Peresani et al., 2011) and the Uluzzian layers A3 and A4 (Tagliacozzo et al., 2013), bird remains have been found in the stratigraphic complex unit A9, an ensemble of thin levels and lenses composed of frost-shattered breccia and aeolian silt, diffused with sands and dark sediments as a result of intense anthropic accumulation. These sedimentary bodies have been surveyed at various intervals through trenches and limited excavated sectors, while more extensive explorations at the entrance of the cave over a 54 m^2 area were undertaken during the last five years. Dwelling structures with hearths and toss-zones have been brought to light: currently, A9 has produced over 50 structures, mostly hearths, scattered at the cave entrance, more in the western than in the eastern zone, in proximity to the present-day drip-line.

Within unit A9, human remains demonstrate the presence of at least one young individual (Benazzi et al., 2014). Zooarchaeological analyses show that the assemblage of determinable bones is dominated by cervids (red-deer, giant deer and roe-deer) over bovids, caprids (ibex and chamois), and other species (marmot, fox, bear, hyena, roe buck). Anthropic actions ascribable to different stages of the butchery process such as skinning, dismembering, and filleting were identified (Romandini et al., 2014b). Within the Mousterian sequence, A9 records the appearance of an exclusively Discoid industry sandwiched between two Levallois cultural units, A10 below and A6 above, with the sterile layer A7 in between (Peresani, 1998). The Discoid industry is typically represented by thick flakes, pseudo-Levallois points, backed flakes with a thin opposite edge, polygonal and triangular flakes, and few scrapers, points, and denticulates. Functional analyses have shown that these tools were being used for different purposes, on soft, medium hard, and hard materials (Lemorini et al., 2003).

The chronometric position of A9 is provided by only one reliable date among a few other measurements of 47.6–45.0 ky Cal BP (Peresani et al., 2008; Higham et al., 2009); new radiocarbon dates are in progress.

3. Materials and methods

The avifaunal fossil remains from unit A9, excavated during 1981–2013 field campaigns, number 680 (Table 1) and have been subjected to taxonomic, taphonomic, and spatial distribution analyses. The anatomic and taxonomic determinations have been based on comparisons with the zoological collections of the Bioarchaeology Section of the Pigorini National Ethnographic Museum and the Italian Institute of Human Palaeontology of Rome. To assess the completeness of the sample, NISP (Number of Identified Specimens), MNE (Minimum Number of Elements), and MNI (Minimum Number of Individuals) were calculated. Ecological, ethological, and biometrical data follows Brichetti (2002), Spina and Volponi (2008), and Sighele and Parricelli (2014). We can use frequencies of skeletal elements such as the wing/leg ratio (Ericson, 1987) or the proximal/distal elements ratio (Bochenski and Nekrasov, 2001). According to these authors, the overrepresentation of legs is anthropogenic and overrepresentation of wings is natural. This suggestion has been criticized (Livingston, 1989; Bovy, 2002), in the case of interpretation of avian assemblage because it has been revealed that similar consequences may result from various causes or a combination of causes, and an integrated approach based on several criteria, particularly direct evidence, is necessary (for details see Laroulandie, 2000, 2001, 2005).

Table 1
NISP (Number of Identified Specimens) and MNI (Minimum Number of Individuals) of bird remains from unit A9 of Grotta di Fumane. The data of the mean weight (g) referable to a single individual and % biomass.

Taxa	NISP	%	MNI	%	Individual mean weight (g)	Biomass %
Anas cf. *crecca*	1	0.2	1	2.3	335	1.1
cf. *Gypaetus barbatus*	1	0.2	1	2.3	6000	19.3
cf. *Aegypius monachus*	2	0.4	1	2.3	10,250	33.0
Aquila clanga	1	0.2	1	2.3	2000	6.4
Falco cf. *tinnunculus*	3	0.6	1	2.3	200	0.6
Falco vespertinus	2	0.4	1	2.3	145	0.5
Falco columbarius	1	0.2	1	2.3	225	0.7
Falco columbarius/vespertinus	3	0.6				
Tetrao tetrix	24	5.1	3	6.8	1115	10.8
Tetrao sp.	2	0.4				
Alectoris graeca	2	0.4	1	2.3	605	1.9
Perdix perdix	2	0.4	1	2.3	375	1.2
Coturnix coturnix	3	0.6	1	2.3	110	0.4
Galliformes unid.	1	0.2				

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