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INTERNATIONAL JOURNAL OF ARCHAEOZOOLOGY



ATTI DEL
10° CONVEGNO
NAZIONALE DI
ARCHEOZOOLOGIA
SIENA
3 - 6 Novembre 2021

The illustration shows a tall, brown tower with a crenellated top and a small bell-shaped structure on top. A smaller, similar structure is visible in the background. In the foreground, a pig with a black and white coat is walking towards the left. The entire scene is set against a white background within a brown border.

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ARCHAEOFAUNA

Laboratorio de Arqueozoología. Depto. Biología.
Universidad Autónoma de Madrid
Cantoblanco 28049. Madrid. España

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The publication of these AIAZ Proceedings has been made possible with the support of the AIAZ

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Imprime:

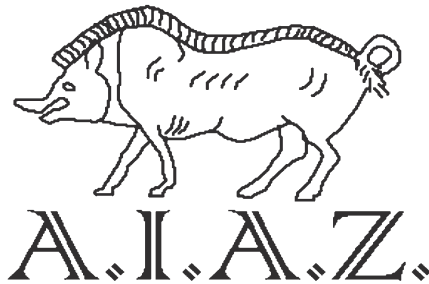
Impresores Digitales S.L.

FRONTISPIECE: Atti del 10° Convegno Nazionale di
Archeozoologia. SIENA. 3 - 6 novembre 2021.

ISSN - 1132-6891
ISBN AIAZ: 978-88-906832-4-4

ARCHAEOFAUNA

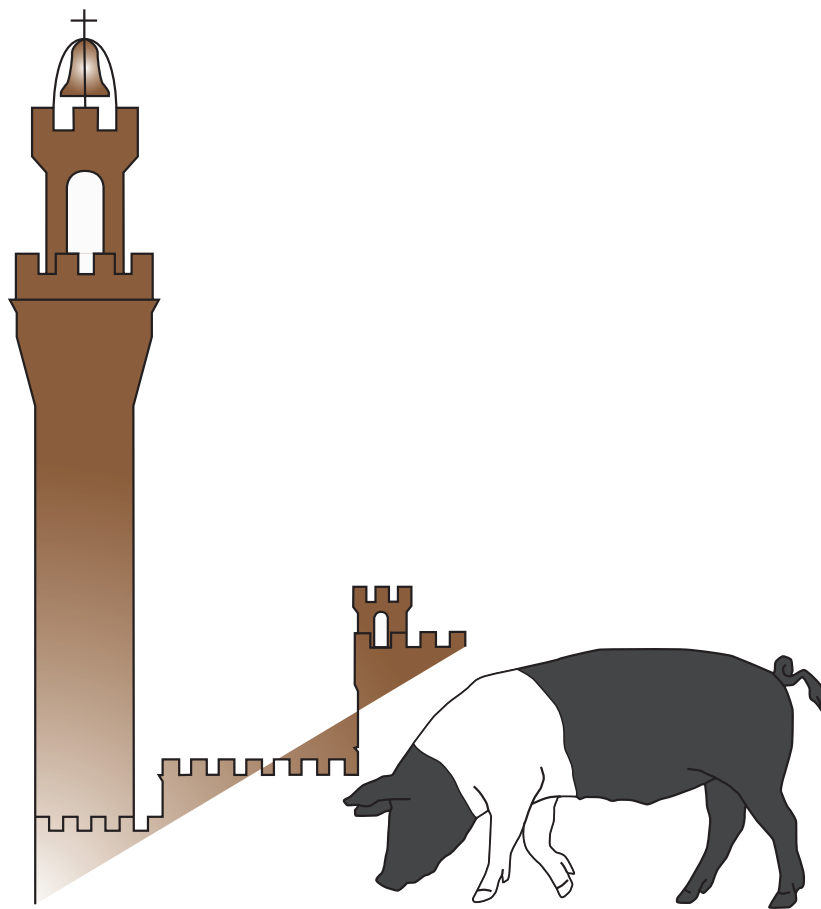
INTERNATIONAL JOURNAL OF ARCHAEOZOOLOGY



The publication of these AIAZ Proceedings has been made possible with the support of the AIAZ.

3 - 6 Novembre 2021
Atti del 10° Convegno Nazionale
di Archaeozoologia

Proceedings of the 10th National
Archaeozoological Conference
3rd-6th November 2021



SIENA

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Vallese-Oppeano 4C: archaeozoological analysis of an Early Bronze Age pile-dwelling site in the Veronese Po Plain

Vallese di Oppeano 4C: analisi archeozoologica dell'insieme faunistico proveniente da un abitato palafitticolo dell'antica Età del Bronzo nella pianura veronese

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(Received 2 December 2022; Revised 18 January 2023; Accepted 10 May 2023)

ABSTRACT: This study presents the results of the archaeozoological analysis carried out on faunal material from the site of Vallese-Oppeano 4C, a pile-dwelling settlement discovered during a preventive excavation conducted by the former Superintendency for Archaeological Heritage of Veneto, between 2014 and 2015, in Vallese di Oppeano (Verona, Italy). The site was occupied during the Early Bronze Age. This chronology is confirmed by anthropic material (pots and sherds) preserved in a waterlogged environment and associated with wooden structures and dump piles containing also animal remains. The faunal assemblage is mainly composed of domestic taxa than wild animals. Pigs are the most represented taxon, followed by sheep, goats and cattle. The presence of dogs is also documented. Wild animals identified include red deer, roe deer, wild boar and a rare attestation of auroch. Among carnivores few remains of wolf, fox, badger and otter are present. Beavers, birds and pond turtles are also scarce. Furthermore, artefacts in animal hard tissues were recovered, including some pointed tools made mainly from the ulnae of different-sized ungulates.

KEYWORDS: PILE-DWELLING, EARLY BRONZE AGE, NORTH-EASTERN ITALY, HUSBANDRY, HUNTING

RIASSUNTO: Il presente contributo fornisce i risultati preliminari dell'analisi archeozoologica condotta sul materiale faunistico proveniente dal sito di Vallese di Oppeano 4C, insediamento di tipo palafitticolo venuto alla luce durante gli scavi d'archeologia preventiva condotti tra 2014 e 2015 a Vallese di Oppeano, nella valle del Bussè, dalla ex Soprintendenza per i Beni Archeologici del Veneto (oggi SABAP Verona, Rovigo, Vicenza). L'occupazione del sito è riferibile al Bronzo antico ed è testimoniata dalla conservazione in ambiente umido di strutture d'abitato in legno, associate a cumuli di scarico contenenti materiale antropico e resti di pasto. La fauna risulta composta principalmente da animali domestici ed in piccola parte da selvatici. Il taxon maggiormente rappresentato è quello dei suini sia per numero dei resti che sulla base del NMI, mentre seguono caprovini e bovini; inoltre è presente il cane. Tra gli animali selvatici il più cacciato è il cervo, seguito da capriolo e cinghiale, mentre si segnala una rara attestazione di uro. Seppur sporadici, sono anche presenti lupo, volpe, tasso, lontra, castoro, qualche resto d'avifauna e di testuggine palustre. Infine, è attestata la produzione di manufatti in materia dura animale, tra cui alcuni punteruoli in osso ricavati soprattutto da ulne di ungulati di diversa taglia.

PAROLA CHIAVE: SITO PALAFITTICOLO, ANTICA ETÀ DEL BRONZO, ITALIA NORD-ORIENTALE, ALLEVAMENTO, CACCIA



RESUMEN: Este estudio presenta los resultados del análisis arqueológico realizado sobre el material faunístico del sitio de Vallese-Oppeano 4C, un asentamiento de palafitos descubierto durante una excavación preventiva realizada por la antigua Superintendencia del Patrimonio Arqueológico del Véneto, entre 2014 y 2015, en Vallese di Oppeano (Verona, Italia). El sitio fue ocupado durante la Temprana Edad del Bronce. Esta cronología está confirmada por el material antrópico (vasijas y tiestos conservados en un ambiente anegado y asociado con estructuras de madera y vertederos que contienen también restos de animales. Los cerdos son el taxón más frecuente, seguido por las ovejas, las cabras y el ganado vacuno. También se documenta la presencia de perros. Los animales salvajes incluyen ciervos, corzos, jabalíes así como un registro de uro. Entre los carnívoros constan escasos restos de lobo, zorro, tejón y nutria. Los castores, las aves y los galápagos son también son escasos. Por último, se recuperaron artefactos óseos que incluyen herramientas puntiagudas hechas principalmente con ulnas de ungulados de diferentes tamaños.

PALABRAS CLAVE: POBLADO DE PALAFITOS, TEMPRANA EDAD DEL BRONCE, ITALIA NOR-ORIENTAL, GANADERÍA, CAZA

INTRODUCTION

An important point of reference for the study of the Bronze Age in Italy is represented by the work carried out by Alfredo Riedel in the Veronese plain in the second half of the 20th century. In the last years the discovery of numerous sites, especially in northern Italy, has allowed for broadening knowledge about the subsistence strategies adopted by human groups in this area (Bertolini *et al.*, 2015a, 2015b, 2021; Bietti Sestieri *et al.*, 2015; De Bandi, 2021; De Grossi Mazzorin, 2015, 2019). The archaeological record shows that from the Early Bronze Age settlements become more stable, adopting economic strategies strongly based on agriculture and animal breeding; the role of hunting in meat recovery seems instead to be strongly reduced (Riedel, 1996). The archaeozoological data available for the Early Bronze Age are still limited in the area between the high and medium Veronese plain. In this scenario the site of Vallese-Oppeano 4C has been recently added (Figure 1). In the Bussè plain (Vallese di Oppeano, Verona), not far from the already known Feniletto Late Bronze Age pile dwelling, during a preventive excavation conducted by the former Superintendency for Archaeological Heritage of Veneto, between 2014 and 2015, following the construction of the Zimella-Cervignano D'Adda pipeline, two new settlements were discovered: site 4C, to the east, dating to the Early Bronze Age, and site 4D, on the west, dating to the Middle Bronze Age, separated by a meter thick sandy-silty grey alluvial layer, deriving from the overbank flow of the river Adige. The site of Vallese-Oppeano 4C

represents a complex pile-dwelling palimpsest of considerable extension. Wooden structures were recovered into a waterlogged environment, associated with dump piles containing anthropic material and animal remains. In particular, this study focuses on faunal remains from a small sector of the settlement, with an area of 5 m x 10 m (Figure 1c), discovered in 2015 south of the main excavation (2014). In this small investigated area, an alternating sequence in the use of space can be recognised: after one hut of the village was destroyed by fire (phase I), the same area was initially used for dumping waste materials from neighbouring dwellings (phase II) and subsequently reorganised with wooden structures (phase III), perhaps indicating a preparation (in Italian *bonifica*), and was finally abandoned after alluvial events (phase IV) (Gonzato *et al.*, 2021). Although chronological attribution of the individual phases is still being developed, the preliminary comparison of the ceramic materials with the sites of Lucone di Polpenazze (Baioni *et al.*, 2021), Lavagnone (Rapi, 2002) as well as the dendrochronological dating of the charred wooden elements from the collapsed hut to a period immediately after 1989-88 ± 10 cal BC (Martinelli, 2022), make Vallese-Oppeano 4C the oldest pile-dwelling site in the Veronese plain. Overall, the site is related to an advanced phase of the Early Bronze Age.

MATERIALS AND METHODS

The faunal assemblage object of this preliminary study comes from the small area of site 4C that showed evidence of a hut destroyed by the fire.

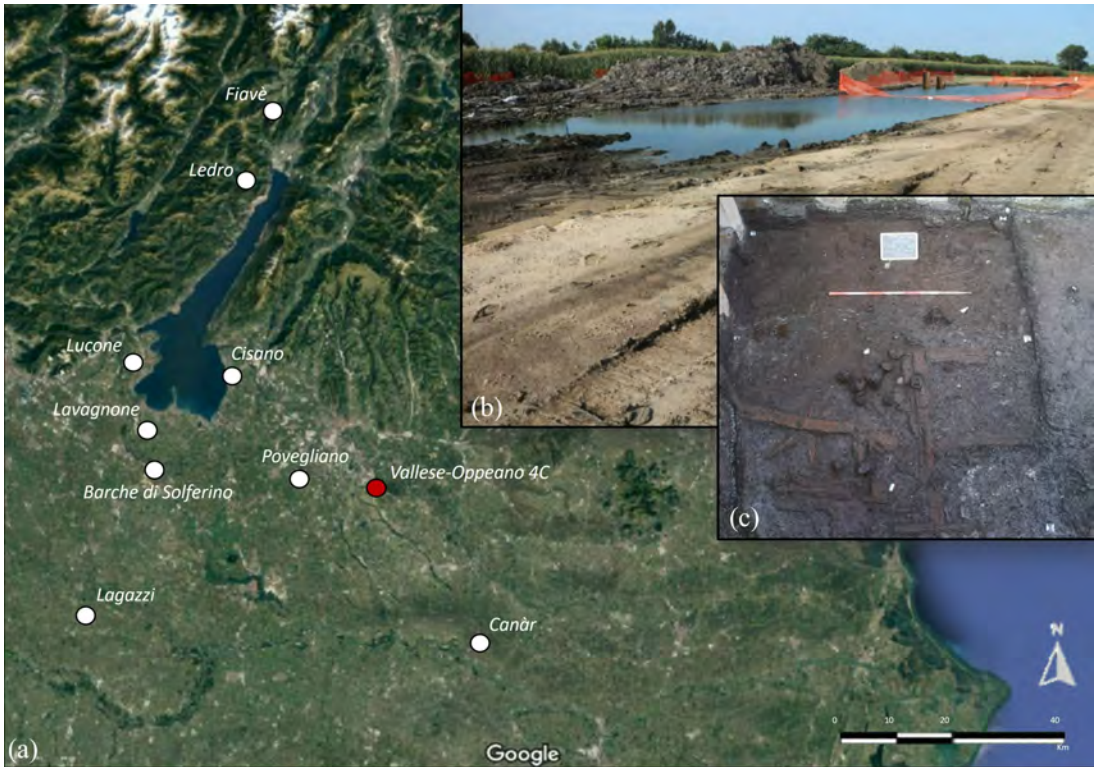


FIGURE 1

Vallese-Oppeano 4C. Localization of the site in the Po Plain (a), Overview of the excavated area (b) and the pile dwelling (c). Courtesy of the SABAP of Vicenza, Verona and Rovigo.

Overall, thanks to the wet conditions of the deposit, the faunal remains show good integrity and the bone surfaces are well preserved. Taxonomic identifications were carried out using the reference collections of the Laboratory of Archaeozoology and Taphonomy (LAT) and of the Large Vertebrates of the Department of Humanities, University of Ferrara. Anatomy atlases (Schmidt, 1972; Barone, 1980) were employed for skeletal and anatomical nomenclatures, and the measurements (in millimetres) were taken according to the criteria established by Driesch (1976). The distinction between sheep and goat was made according to the criteria proposed by Zeder & Lapham (2010) and Zeder & Pilaar (2010), while size was considered for the distinction between pig and boar (Rowley-Conwy *et al.*, 2012) and between cattle and aurochs (Wright, 2013). Sheep and goat elements lacking discriminative morphological features were classified as *Capra vel Ovis*. When no uniquely diagnostic characters were present to distinguish a domestic taxon from its wild relative, the remains were included

in the categories *Sus* sp. and *Bos* sp. Regarding the remains that were not identifiable at the species or genus level due to the lack of diagnostic morphological elements, e.g. vertebrae and ribs, the following taxonomic levels were used: cfr. *Sus* sp., small- and medium-sized Canidae, medium- and large-sized Cervidae and Bovidae. Unidentified remains were classified considering the morphology of the bones (long, flat and articulated/compact bones) related, whenever possible, to the size of the animals. NR (Number of Remains), NISP (Number of Identified Specimens), MNE (Minimum Number of Elements), MNI (Minimum Number of Individuals) and MAU (Minimum Animal Units) (Lyman, 1994a) are the indices used to quantify the identified elements. Since it was not possible to recognize a precise chronological attribution for each US to the different utilization phases of the area, in this preliminary work we decided to treat the faunal sample in a unified way for the estimation of the MNI. Teeth eruption degree, dental wear and stage of bones epiphysis fusion were used to assess the

age at death of domestic mammals (Silver, 1969; Payne, 1973; Grant, 1982), while for wild mammals, the criteria of Mariezkurrena (1983) and Tomé & Vigne (2003) were applied to red deer and roe deer, respectively. In order to distinguish taphonomic modifications, microscopic analyses of bone surfaces were carried out using a Leica S6D Greenough stereomicroscope with a 0.75-70X magnification range, also employed for capturing images. Edaphic modifications were distinguished from anthropic marks according to the criteria established by Behrensmeyer (1978), Binford (1981), Lyman (1994b) and Fernández-Jalvo & Andrews (2016). The terminology proposed by Camps-Fabrer *et al.* (1990) was adopted for the hard animal material tools and the criteria established by Camps-Fabrer & Stordeur (1979) were followed for their orientation.

RESULTS AND DISCUSSION

Faunal assemblage

The analysed sample consists of 1,236 faunal remains. Identification at different taxonomic levels was possible for 1,004 finds, representing 81.2% of the bone assemblage, while the remaining percentage is represented by unidentified elements, which were related to the size of the animals whenever possible. Concerning the integrity of the finds identified, only 7% are complete elements, while incomplete elements (including diaphyses with at least one whole epiphysis for more than half) account for 46% and fragments for 47% of the assemblage. All identified skeletal elements belong to both the axial and appendicular skeletons, showing a clear prevalence of mandibles. Almost entirely mammals are documented in the faunal composition (Table 1), although birds (not yet identified at the species level) and pond turtles are also present in a small percentage. Among the identified elements, domestic mammal remains (379) prevail over those of wild mammals (139), while the remaining finds were classified at genus or family level for the lack of diagnostic anatomical morphologies. If we considered only the remains identified at species level, the percentages of domestic and wild mammals would be 83% and 17% respectively. Therefore, the most represented mammal taxon is the pig (*Sus domesticus*) with 34.3%. Sheep (*Ovis aries*) and goat (*Capra hircus*)

count overall 24.4%, while cattle (*Bos taurus*) are 21.1%. The presence of dog (*Canis familiaris*) is attested with 3.5%. Concerning wild animals, red deer (*Cervus elaphus*) dominates the assemblage (10.8%), followed by roe deer (*Capreolus capreolus*) with 2.2%; to avoid overestimation of these two species, their shed-antlers were computed separately from the counting of wild mammals. Wild boar (*Sus scrofa*) is also present with 1.5%. Auroch (*Bos primigenius*) is attested by only one remain (0.2%), a large-size astragalus (GLI = 83). Among carnivores, wolf (0.2%), fox (0.2%), badger (0.4%) and otter (0.4%) are present. Among rodents, beaver (*Castor fiber*) reaches instead 0.7%. Only three remains belong to a large-sized bird of prey, while the pond turtle (*Emys orbicularis*) is represented by a few plastron fragments.

Domestic fauna exploitation

Considering only the relative proportions of the economically most important domestic taxa, pigs prevail with 43%, followed by sheep and goats (30.6%) and cattle (26.4%). Pig is represented by 14 individuals, including 3 juveniles, 6 sub-adults and 5 adults, based on the presence of erupting and worn permanent lower teeth (M_3) and scapulae with non-fused distal epiphysis. As shown by the mortality curve (Figure 2), 21% of the individuals were slaughtered within the first year of life, 43% within 22 months, and the remaining 36% passed their second year. Regarding the management of caprovines, a total of 11 individuals were estimated, of which 1 goat and 4 sheep were recognised. Based on the presence of deciduous (dp_4) and lower permanent teeth (P_4), there are at least 2 juveniles, 6 sub-adults and 3 adults. It was estimated that 18% of the individuals were killed within 6-12 months and 55% within 12-24 months, likely to obtain tender and higher-quality meat respectively. Furthermore, 27% of individuals killed within 48-72 months could instead indicate the exploitation of caprovines for milk production and wool supply. Lastly, cattle are represented by 6 individuals, distributed over 2 just young, 2 sub-adults and 2 adults, based on the presence of deciduous (dp_3) and lower permanent teeth (P_3). The mortality curve shows that 16% of individuals are slaughtered within 18-24 months, indicating the possibility of obtaining higher-quality meat. The contemporary presence of young individuals

Taxa	NISP	%NISP	%domestic / wild mammal species	%domestic		MNI	%MNI	MNE	MAU
<i>Canis familiaris</i>	16	1.6%	3.5%	4.2%		3	5.9%	5	2.5
<i>Sus domesticus</i>	156	15.5%	34.3%	4.01%	43.0%	14	27.5%	16	8
<i>Bos taurus</i>	96	9.6%	21.1%	25.3%	26.4%	6	11.8%	8	4
<i>Capra hircus</i>	9	0.9%	2.0%	2.4%	2.5%	1	2.0%	2	1
<i>Ovis aries</i>	14	1.4%	3.1%	3.7%	3.9%	4	7.8%	4	2
<i>Capra vel Ovis</i>	88	8.8%	19.3%	23.2%	24.2%	6	11.8%	11	5.5
Total domestic mammals	379	38%	83%	100%	100%	34	66.7%		
<i>Castor fiber</i>	3	0.3%	0.7%			1	2.0%	1	0.5
<i>Lutra lutra</i>	2	0.2%	0.4%			1	2.0%	1	0.5
<i>Meles meles</i>	2	0.2%	0.4%			1	2.0%	1	0.5
Cfr. <i>Canis lupus</i>	1	0.1%	0.2%			1	2.0%	1	1
<i>Vulpes vulpes</i>	1	0.1%	0.2%			1	2.0%	1	0.5
<i>Sus scrofa</i>	7	0.7%	1.5%			1	2.0%	1	0.5
<i>Bos primigenius</i>	1	0.1%	0.2%			1	2.0%	1	0.5
<i>Cervus elaphus</i>	49	4.9%	10.8%			4	7.8%	5	2.5
<i>Capreolus capreolus</i>	10	1.0%	2.2%			3	5.9%	2	1
Cervidae large size	51	5.1%							
Cervidae medium size	12	1.2%							
Total wild mammals	139	14%	17%			14	27.5%		
Canidae medium size	2	0.2%							
Canidae small size	1	0.1%							
<i>Sus</i> sp.	46	4.6%							
Cfr. <i>Sus</i> sp.	170	16.9%							
<i>Bos</i> sp.	28	2.8%							
Bovidae large size	104	10.4%							
Bovidae medium size	127	12.6%							
Aves	3	0.3%				1	2.0%	1	0.5
<i>Emys orbicularis</i>	5	0.5%				2	3.9%	2	2.0
Total identified	1004	100%	100%			51	100%		
Large-medium size mammals	6								
Medium size mammals	11								
Medium-small size mammals	11								
Small size mammals	2								
Total	1,034								
Unidentified	202								
Total faunal remains	1,236								

TABLE 1

Vallese-Oppeano 4C. Composition of the fauna assemblage.

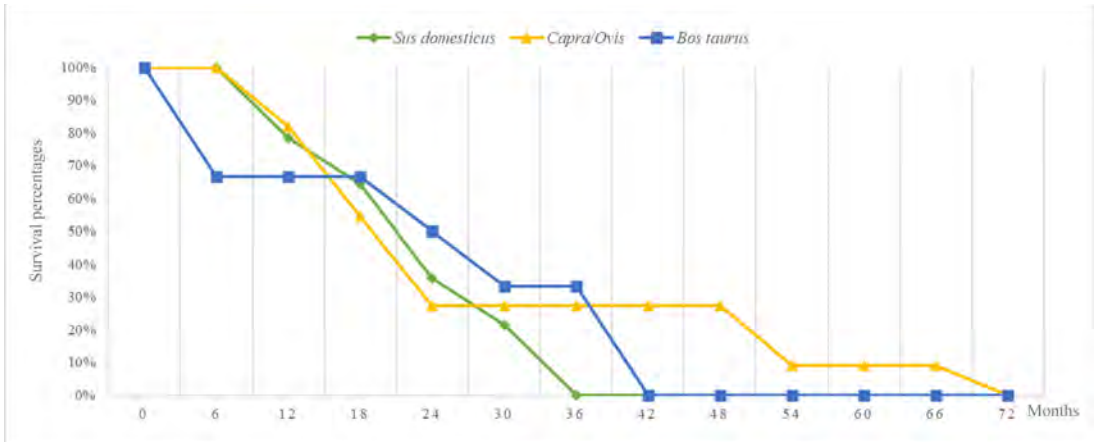


FIGURE 2

Vallese-Oppeano 4C. Mortality profiles of the domestic taxa.

slaughtered within 5-6 months from birth (33%) and adults older than 3 years (33%) could be related to the recovery of secondary products, such as milk. Regarding the distribution of the anatomical elements of these domestic species, both parts of the skull and parts of the appendicular skeleton are present (Figure 3); the elements of the axial skeleton (identified only at the taxonomic level of family), however, consist mainly of ribs rather than vertebrae. More precisely, the estimation of the skeletal survival index (MNE/eNE) (Supplementary Figure S1) shows that the most represented anatomical elements are portions of maxilla with M^2 (0.57) and mandible with M_3 (0.46) for pig, humerus (0.92), tibia (0.92) and portions of mandible with dP_4 (0.45) for goat and sheep, while astragalus (0.67), scapula (0.42) and radius (0.42) for cattle. According to these results, the estimation of MAU vs. MNI suggests that more than half of the pig, caprovine and cattle carcasses were slaughtered on-site. In contrast, the low representation of the femur for goats and cattle and the high fragmentation of the same element for pigs could indicate a selection and an off-site slaughter of this portion of the hind limb. Compared to the previously described domestic animal, the dog is represented by 3 individuals based on 3 right mandibles. Considering the age at death, estimated on the basis of a maxilla with erupting permanent premolars and a radius with both epiphyses fused, 1 sub-adult within 5-6 months and 1 adult older than 12 months have been recognised. The few remains attributed to this taxon consist mainly of mandibles, skull and forelimb bones.

Wild fauna exploitation

Hunting represents a secondary resource in the site's economy, but still plays a modest role in the food supply. Red deer and roe deer represent the most hunted species, with 4 individuals for the former and 3 for the latter. Considering their age at death, estimated on the basis of 1 unworn upper deciduous tooth (dp^4) and 3 humeri with fused distal epiphysis, 1 young and 3 adult red deer individuals have been recognized, while at least 1 juvenile (< 5 months) and 2 adult roe deers were estimated, based on the presence of 1 coxal with unfused acetabulum and 2 mandibles (M_3) with different extent of wearing. Regarding the distribution of the anatomical elements of these two cervid species, parts of the skull and the appendicular skeleton are present. Forelimb elements (mainly metacarpus and humerus) are the most represented for red deer, conversely, the hind limb (mainly tibia and femur) is more represented for roe deer. Elements belonging to the axial skeleton are almost completely absent for roe deer, whereas vertebrae and ribs determined as large-size Cervidae can be associated with red deer. The presence of unshed antlers and skulls of both cervids agrees with the results of the comparison between MAU and MNI, suggesting a complete carcass transport within the settlement for more than half of the red deer individuals and one-third of the roe deer ones. Some hypotheses on the seasonality of cervid hunting are also possible to be formulated. If we accept a standard birth at the end of May or in June, the presence on the base of the stratig-

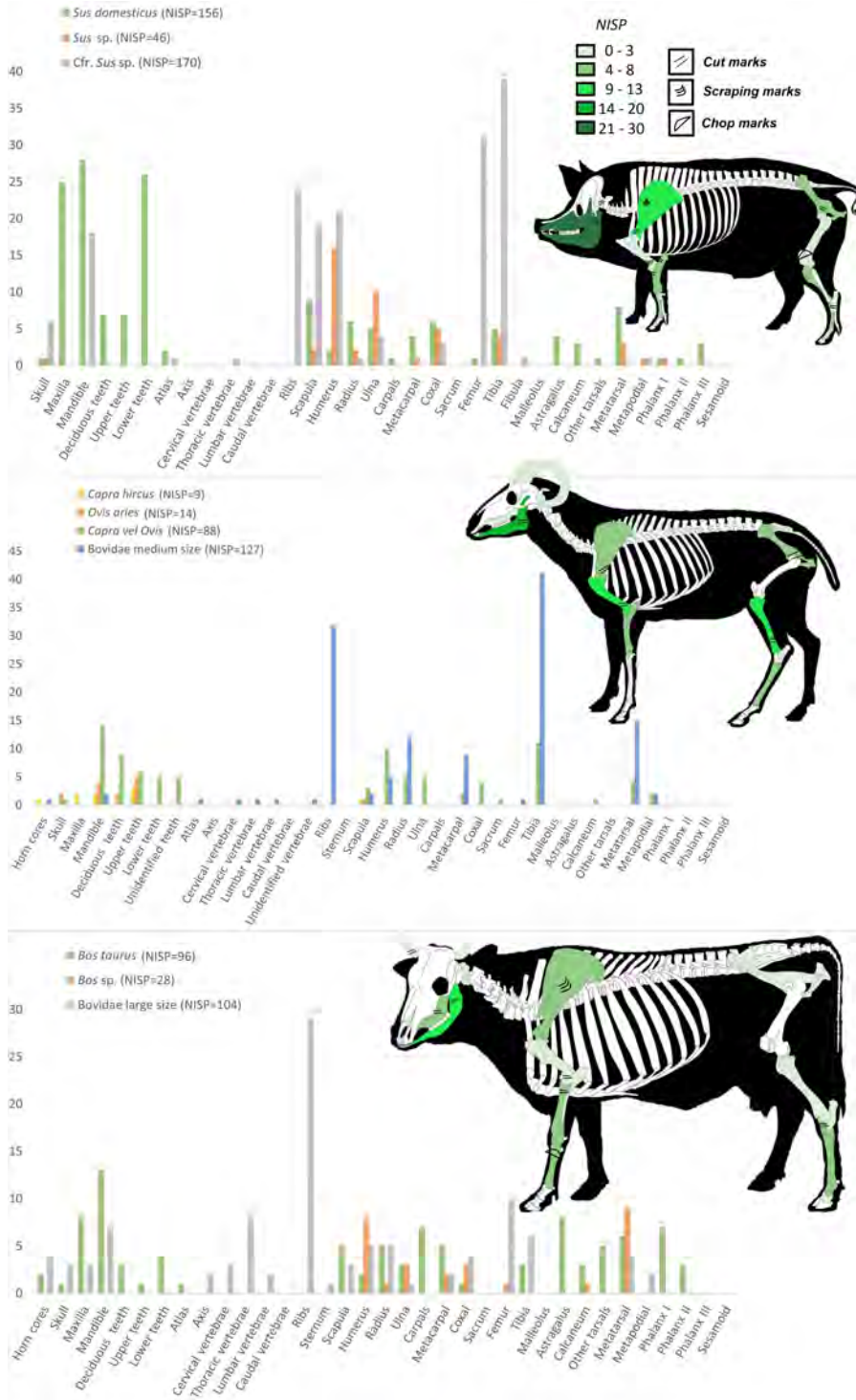


FIGURE 3

Vallese-Oppeano 4C. Frequency of the anatomical representation of the domestic taxa. The silhouettes show the chromatic distribution of the identified elements of *Sus domesticus*, *Capra vel Ovis* and *Bos taurus*, with localisation of cut marks, scraping marks and chop marks.

raphy of 2 well-developed antlers fused to skulls belonging to both species suggests probable times of death within May-September and August-February for roe deer and red deer respectively. The presence, instead, of a very young roe deer hip bone from the roof of the stratigraphy suggests that the animal must have died between June and October. Overlapping cervid seasons of death, it is possible to suppose that hunting was surely carried out from at least mid-spring (May) to mid-autumn (October). As for other wild taxa, all species are represented by only 1 individual each, except for the pond turtle (MNI 2).

State of preservation of bone surfaces

Overall, faunal remains are well preserved. Among the modifications affecting bone surfaces, weathering cracks are the most frequent alter-

ations, showing that 5% of the bone assemblage had been exposed to changes in temperature and humidity. Root etching and fungal hyphae have been identified on 2.3% of the remains, while deposition of manganese and iron oxides was recorded on 2.6% and 3.1% of the analysed bones, respectively. Concretions (3%) and erosions (2.2%) are also present on bone surfaces. Carnivore activity was evidenced on 1.2% of the bone assemblage, with a prevalence of pits and puncture marks, while traces left by rodent incisors were found on only 1 remain.

Anthropic modifications

Regarding the processing of domestic carcasses, it is possible to propose some considerations only for the economically-relevant taxa, which are the most represented. The anthropic marks

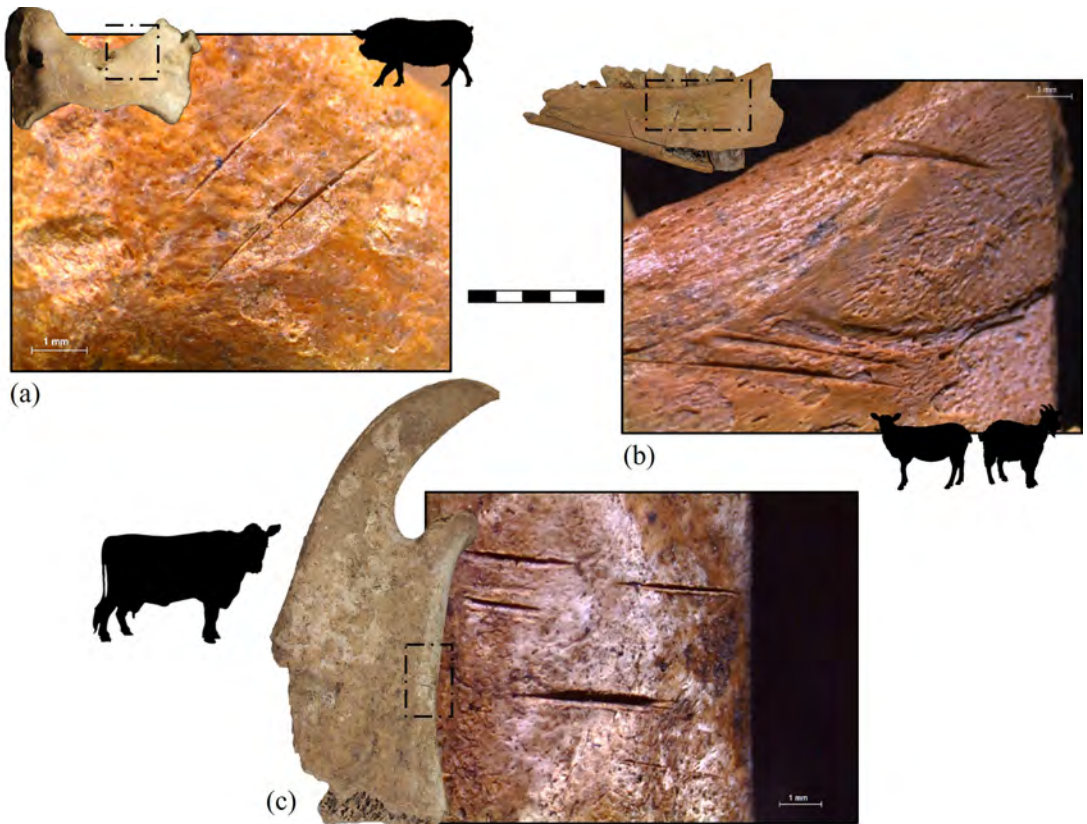


FIGURE 4

Vallese-Oppeano 4C. Butchery marks related to disarticulating the cranium on a pig atlas (a). Cutmarks for skinning on sheep/goat mandible (b) and for disarticulating the mandible on a cattle remain (c).

identified (Figure 4) on pig remains refer mainly to the skinning phase (with localisation on the mandible and tarsals) and disarticulation (on the atlas and coxal), but some related to defleshing were also documented. For goats and sheep, morphology and position of the marks mainly indicate defleshing and disarticulation of the forelimb, but the skinning phase was also observed. The traces found on the cattle remains document mainly skinning actions, but also those related to disarticulation and defleshing; furthermore, chop marks found at the base of a horn core could indicate the recovery of the horn sheath. Concerning the treatment of wild carcasses, the recognised evidence on cervid remains is mainly related to the skinning and disarticulation phases. Traces of the different slaughter phases were also found on wild boar and aurochs, on carnivores such as wolf, badger and otter, as well as on the few beaver and bird remains.

Bone industry

Pointed tools are the most represented category in the hard animal material industry. The production of bone awls is documented by shaping the distal edge of 2 ulnae with unfused proximal epiphyses of caprovine and cattle. Preliminary observation under the stereomicroscope revealed the presence of rounded, shiny and polished surfaces, suggesting the use of these tools to perforate soft materials such as skin. The awl obtained from a caprovine's ulna also shows evidence of anthropic modification on the cranial and caudal edges of the olecranon, aimed to obtain a more ergonomic grip or perhaps to hang this bone tool (Figure 5a, b). Furthermore, the exploitation of the red deer carcass is also aimed at the production of some bone tools, still under study, including an awl made from an ulna and a possible loom awl made from a metapodial (Figure 5c, d).



FIGURE 5

Vallese-Oppeano 4C. Bone tools; awls on a caprovine (a), cattle (b) and red deer (c) ulna and a loom awl on a red deer metapodial (d).

Comparison with other Early Bronze Age sites

Finally, the faunal assemblage of Vallese-Oppeano 4c was compared with those of northern Italy’s main Early Bronze Age sites (Figure 6), most of which are pile-dwelling sites. Looking at the relative abundances of the main economically important domestic taxa, Vallese-Oppeano 4C is very similar to the Canàr and Lucone sites, with an economy based mainly on the exploitation of pigs, accompanied by the breeding of goats and sheep. On the other hand, the frequency of wild taxa for most sites is less than 5 %, while Vallese-Oppeano 4c and Barche di Solferino are the only exceptions, showing a fairly significant presence of wildlife (around 15 %).

CONCLUSIONS

The archaeozoological data show that the area surrounding the site of Vallese-Oppeano 4C comprised both woodlands (based on the presence of red deer, roe deer and wild boar) and wetlands (based on the presence of beaver, otter and pond turtle). The economy appears balanced and focuses mainly on pig and caprovines breeding as the main source of tender and high-yield meat. Goat and sheep breeding and the exploitation of cattle are also aimed at obtaining secondary products such as milk and wool. The production of bone

tools (awls) is also attested for caprovines and cattle. In the subsistence economy of the settlement, hunting represents a secondary resource, yet the frequency of wild species at Vallese-Oppeano 4C, which represent 17% of the identified mammal remains, appears to be higher compared to other Italian sites in the Veronese plain. Hunting is mainly focused on red deer and roe deer. Based on the presence of unshed antlers and very young cervid remains, it is possible to assume a hunting seasonality from at least mid-spring (May) to mid-autumn (October). These animals, in addition to their food role in the economy, were used for the recovery of fur and the production of tools. Among other wild taxa, wild boar and aurochs are hunted, although less intensively, while the hunted carnivores include wolf, fox, badger and otter. The exploitation of beaver for fur recovery is also attested. In Vallese-Oppeano 4c a homogeneous breeding economy and a modest but significant presence of wildlife compared to other coeval sites could be linked to less intensive agriculture. In addition, the high proportion of pigs, which are considered pioneer domestic animals that adapt well to largely forested territories, could indicate a phase of colonization of the area. Therefore, Vallese-Oppeano 4c could be identified as a pioneer site for the activation of a new village in a territory still largely occupied by wooded areas associated with watercourses. To confirm these hypotheses and to establish whether the manage-

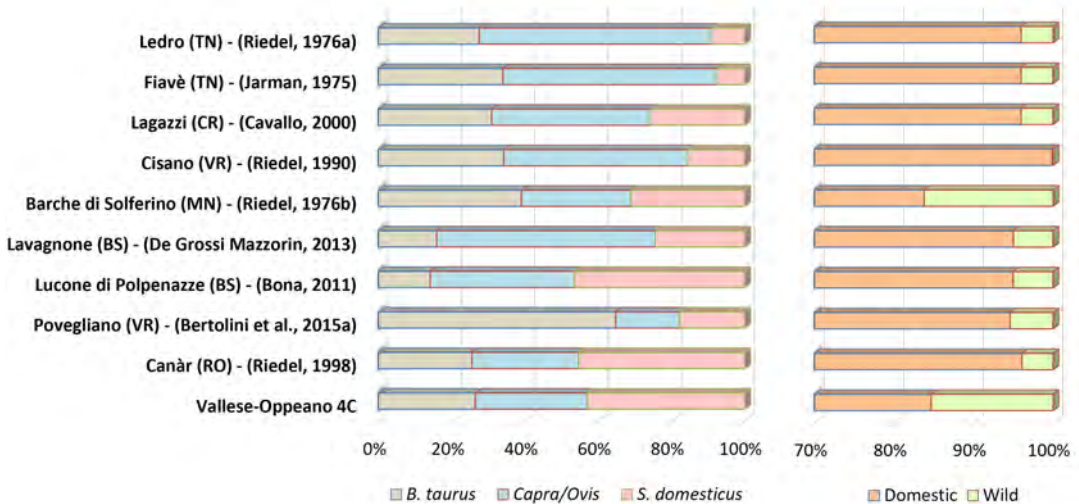


FIGURE 6

Vallese-Oppeano 4C. Comparison of the fauna composition of the main Bronze Age sites in north-eastern Italy.

ment of animal resources in the Vallese-Oppeano 4C site was linked to certain environmental conditions or precise cultural or economic aspects, it will be necessary to integrate these data with the study of faunal remains from the main excavation area (2014) and above all a comparison with archaeobotanical analyses.

LIST OF OSTEOLOGICAL MEASUREMENTS - SUPPLEMENTARY APPENDIX S2

ACKNOWLEDGEMENTS

The authors thank Roberta Anedda and Lucilla Angeletti for the data collection.

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SUPPLEMENTARY APPENDIX S2

LIST OF OSTEOMETRIC MEASUREMENTS
(FOLLOWING VON DEN DRIESCH, 1976)*Sus domesticus*

Mandible: **1)** (10L)=29; (10B)=15; **2)** (10L)=31; (10B)=15; **3)** (10L)=31; (10B)=14; **4)** (10L)=35; (10B)=16; **5)** (10L)=36; (10B)=17; **6)** (10L)=37; (10B)=16; **7)** (10L)=37; (10B)=17;

Scapula: **1)** GLP=32; BG=24; **2)** GLP=34; BG=25; **3)** GLP=37; BG=27,7; **4)** GLP=39; BG=28; **5)** GLP=41; BG=31;

Humerus: **1)** Bd=39; BT=33; **2)** Bd=43; BT=36;

Radius: **1)** Bp=29;

Ulna: **1)** DPA=55; SDO=46;

Tibia: **1)** Bp=43; **2)** SD=16; Bd=27; **3)** Bd=38; **4)** Bd=40; **5)** Bd=40;

Calcaneum: **1)** GB=19; **2)** GL=77; GB=20; **3)** GB=20;

Astragalus: **1)** GLm=35; Dm=23; Bd=22; **2)** GLl=42; GLm=38; Dl=21; Dm=23; Bd=25; **3)** GLm=39; Dm=24; **4)** GLl=44,4; GLm=42; Dl=24; Dm=22,2; Bd=25;

Cubonavicular: **1)** GB: 40

II Phalanx: **1)** GL=25; Bp=17; SD=15; Bd=16

III Phalanx: **1)** DLS=29; Ld=28; MBS=12; **2)** DLS=31; Ld=30; MBS=11

Bos taurus

Atlas: **1)** BFcd=86

Scapula: **1)** GLP=71; LG=60; BG=47

Humerus: **1)** Bd=75; BT=65;

Radius: **1)** Bp=73,3; BFp=66,2; **2)** Bp=86; BFp=78;

Tibia: **1)** Bd=53; **2)** Bd=64;

Astragalus: **1)** GLl=55; GLm=50; Dl=29; Dm=26,6; Bd=35; **2)** GLl=57,7; GLm=52,7; Dl=32; Dm=30; Bd=36,1; **3)** GLl=60; GLm=57; Dl=32; Dm=31; Bd=32,7; **4)** GLl=60,5; GLm=53,3; Dl=35,25; Dm=29,15; Bd=37,2; **5)** GLl=64,4; GLm=57,2; Dl=36,6; Dm=33; Bd=41; **6)** GLl=65; GLm=59; Dl=36,6; Dm=34; Bd=45; **7)** GLl=68,8; GLm=64,4; Dl=35,5; Dm=36; Bd=44,4;

Cubonavicular: **1)** GB=53; **2)** GB=54; **3)** GB=54,6; **4)** GB=57;

Metacarpal: **1)** Bp=48,3; **2)** Bp=51,1; **3)** Bp=63; **4)** Bd= 50;

Metatarsal: **1)** Bp=37,2; SD=20; **2)** SD=24,4; Bd=49; **3)** Bp=40; **4)** Bp=47,7; **5)** Bp=51;

I Phalanx: **1)** GLpe=58; Bp=38; SD=29; Bd=32; **2)** GLpe=59; SD=24,4; Bd=25,5; **2)** GLpe=60; Bp=36; SD=28; Bd=30,5; **3)** GLpe=64; Bp=31,1; SD=25; Bd=28,3; **4)** GLpe=65; Bp=30,5; SD=26; Bd=28;

II Phalanx: **1)** GL=38; Bp=29; SD=23; Bd=23;

Capra hircus

Scapula: **1)** GLP=33; BG=21

Ovis aries

Scapula: **1)** GLP=33; BG=21

Sus scrofa

Scapula: **1)** GLP=49,4; BG=35;

Humerus: **1)** Bd=52; BT=46;

Bos primigenius

Astragalus: **1)** GLl=83; GLm=75,5; Dl=46; Dm=42; Bd=50;

Cervus elaphus

Mandible: **1)** (10L)=31; (10B)=13; **2)** (10L)=34; (10B)=14;

Humerus: **1)** Bd=53; BT=48; **2)** Bd=53,8; BT=50;

Astragalus: **1)** GLl=55,5; GLm=53; Dl=30; Dm=31; Bd=33;

Metacarpal: **1)** Bp=38; **2)** Bp=39; SD=22; **3)** Bp=39,4; **4)** Bp=42,2; **5)** Bp=43,3;

Metatarsal: **1)** Bp=35,5;

I Phalanx: **1)** GLpe=41; Bp=20,5; SD=16; Bd=17,2; **2)** GLpe=56; Bp=21; SD=18; Bd=21;

II Phalanx: **1)** GL=40; Bp=20; SD=15; Bd=16,6

III Phalanx: **1)** DLS=51; Ld=43; MBS=17;

Aves

Radius: **1)** Bd=16 SC=6,6