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Etruscan Economics: Forty-Five Years of Faunal Remains from Poggio Civitate

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## Etruscan Economics: Forty-Five Years of Faunal Remains from Poggio Civitate

**Abstract:** Since the mid-1960s, excavations at the Etruscan site of Poggio Civitate have recovered large amounts of faunal material (bone, tooth, and antler fragments). Nearly forty years after excavations began, the first detailed analysis of this material is finally underway. This article presents the initial results of zooarchaeological investigations at Poggio Civitate, with a focus on remains from the 7<sup>th</sup> century BCE Orientalizing period of occupation at the site. We discuss the functional, economic, and taphonomic implications of the faunal assemblages from three distinct areas of the site, representing elite debris, industrial activities, and possible ritual architecture. Faunal remains from a structure thought to be an elite residence include a higher proportion of cattle, deer, and large wild animals (boar, bear, and wolf) than the rest of the site. These animals would have likely played significant roles in signaling elite status to those who hunted them and/or displayed them as trophies. Although non-elite residences have yet to be identified at Poggio Civitate, an extensive workshop area suggests that a large number of non-elite people worked on the hilltop. The faunal assemblage from the workshop area shows a higher focus on sheep and pigs and a more diverse range of birds than in other areas of the site, possibly related to the various industrial activities that took place in the workshop. Finally, we explore how faunal remains might add to our understanding of a building thought to have a ritual function. By elucidating the various activities that likely occurred in each of the areas of Poggio Civitate, the faunal data also help us to better understand the function of the site in the surrounding region before its intentional destruction in the mid-6th century BCE. The zooarchaeological analyses presented here support the interpretation of Poggio Civitate as a self-sufficient site. Wool exploitation appears to have been part of a complex economy that also involved meat and milk products, onsite butchery, and meat distribution at a local scale. Cattle management was aimed not at keeping cattle to older ages for agricultural exploitation, but at prime-age animals killed for their meat, possibly reflecting elite consumption, such as at

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banquets and displays of wealth. With future zooarchaeological data collection and analysis at Poggio Civitate, we can explore these initial observations in greater depth.

**Keywords:** Poggio Civitate (Murlo), zooarchaeology, Orientalizing period, fauna, food production, economy, industry, hunting

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## Introduction

This article presents the first analytical results on the faunal remains recovered from over 45 years of excavation at the Etruscan site of Poggio Civitate. Poggio Civitate is located on a hilltop in the commune of Murlo, approximately 25 km south of Siena. To date, excavations have recovered a large amount of occupational debris from the seventh to sixth centuries BCE, spanning the Orientalizing through Archaic periods. In addition, excavators recovered a small amount of older (Iron Age) material. Fauna analyzed to date come primarily from the seventh century BCE Orientalizing period of occupation at the site, which lasted for about 50 years before the entire site was destroyed by fire.

Faunal analysis provides more evidence for much of what we understand indirectly through artistic representations and artifacts. Faunal data can be used to challenge, support, or refute lines of interpretation. Their investigation can help fill in the gaps and deepen our understanding of a site, and even challenge previous interpretations or highlight new areas of research. Our initial analyses reported here are aimed at establishing a baseline of understanding about issues of diet, economy, and function for the different areas of the plateau from the Orientalizing period. The final publication of the materials must await the completion of excavation of the site and assessment of all available forthcoming faunal assemblages.

## Seventh-Century Poggio Civitate

During the Orientalizing period, Poggio Civitate consisted of three large buildings, referred to as the Residence, Tripartite Building, and Workshop. The elaborately decorated Residence, excavated during the 1970s, produced artifacts indicative of banqueting, elegant personal adornment, and richly crafted furniture,

and was probably home to an elite family.<sup>1</sup> Over 1,700 specimens<sup>2</sup> (NISP) reported here came from this building.

In the 1900s, an adjacent building was uncovered, named the Tripartite Building for its layout. It has been suggested that this building was an early example of a temple because of its architectural features and examples of luxurious inscribed vessels found within it.<sup>3</sup> Only a small sample of faunal remains from the Tripartite Building has been identified to date (468 specimens). Since much of this building was destroyed in the subsequent building phase at the site, these 468 samples may represent the only known specimens from this area.

During the 1980s, excavations began on a monumental building that produced large amounts of materials related to manufacturing, such as bone and antler working, terracotta manufacture, ceramics production, bronze casting, and textile manufacture. The processing of animal carcasses for meat and other products is indicated by the vast amounts of faunal debris recovered in and around this elegantly decorated building, called the Workshop. Excavations in the Workshop continue today, and the large amount of material culture so far unearthed suggests intensive production. To date, no products manufactured at Poggio Civitate have been found at other sites in the region. It is, therefore, thought that the Workshop served as a manufacturing center for the region, with nearly all production and consumption occurring locally, on the hilltop and in the surrounding hinterland. Faunal analysis to date has identified more than 2,000 specimens from the Workshop, and this number will grow significantly as analysis continues on the vast numbers of specimens awaiting analysis and continuing to be excavated.

## Analytical Methods

Faunal remains were sorted from the other excavated materials and stored in plastic bags. A tag was added to each bag to indicate the area and trench number, and frequently the date or year excavated and the initials of the trench supervisor. Trench supervisors recorded the number of bones recovered daily in their field notebooks. Most bones appear to have been washed. Any bones worked into tools or other artifacts were recorded and stored separately. All the non-worked bone was stored in crates and boxes in the storage area in Murlo. Though there is a large

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1 Nielsen and Tuck 2001.

2 In this study, an “identified” specimen is one for which the skeletal element and taxon can be determined. Numbers are given as NISP (number of identified specimens), unless otherwise noted.

3 Nielsen and Tuck 2001.

amount of faunal material in the storage area, we do not know how representative this is of the total faunal material collected over 45 years of excavation, as methodological strategies have evolved over time and new standards of data collection have been introduced over the decades of excavation.

Analysis of the data presented here took place in the field laboratory in Murlo during the summer field seasons of 2002 (MacKinnon) and 2011–2012 (Kansa). In all, 5,535 specimens have been analyzed to date (1,310 by MacKinnon and 4,225 by Kansa). All faunal materials identified by Kansa received a unique bone catalog number ranging from PC-0001 to PC-4225. Kansa wrote her initials (SWK) and the range of bone numbers contained within each bag on the outside and inside of the bag. Bones analyzed during 2002 by MacKinnon were not given unique bone numbers, but “MM 2002” was written on the tag. Bags that both MacKinnon and Kansa analyzed have both analysts’ notations on the tag. A specimen was deemed diagnostic (“identifiable”) if both the skeletal element and the taxon<sup>4</sup> could be determined. Kansa separated out all non-diagnostic (unidentified) fragments from each bag. She counted these and stored them in a separate bag from the diagnostic bones. All bags of bones are stored in crates and boxes in the storage facility in Murlo.

Reference manuals were used lieu of a modern reference collection. Identification was aided primarily by illustrations in Schmid.<sup>5</sup> Distinctions between sheep and goats were facilitated by Boessneck et al.; Boessneck; Prummel and Frisch; and Zeder and Lapham.<sup>6</sup> Questionable identifications were checked against modern specimens at the Museum of Vertebrate Zoology at the University of California, Berkeley.<sup>7</sup> All measurements follow the methods and abbreviations provided in von den Driesch.<sup>8</sup> Tooth eruption and wear stages for sheep and goats follow Zeder<sup>9</sup> and Payne,<sup>10</sup> and for pigs Hongo and Meadow.<sup>11</sup> Fusion stages for sheep, goats, cattle, and pigs are based on Silver.<sup>12</sup> Sex distinctions for sheep, goats, and cattle are based on the morphology of the pelvis and the metapodials, as described

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**4** “Taxon” refers to the animal group, which is often identified at the species level but sometimes only to the level of genus or broader.

**5** Schmid 1972.

**6** Boessneck et al. 1964; Boessneck 1969; Prummel and Frisch 1986; Zeder and Lapham 2010.

**7** We are grateful to Carla Cicero and Chris Conroy for facilitating access to the bird and mammal skeletal collections.

**8** von den Driesch 1976.

**9** Zeder 1991.

**10** Payne 1973.

**11** Hongo and Meadow 1998.

**12** Silver 1969.

in Boessneck<sup>13</sup> and Grigson.<sup>14</sup> For pigs, sex distinction was made only on mature specimens with canines or canine alveoli present.

Kansa recorded directly into an Excel spreadsheet, while MacKinnon recorded on paper and later entered all data into Excel. Both analysts used the following fields for the various quantitative and qualitative data recorded: context information, bone number, taxon, element, side, fragmentation, skeletal area, sex, age, cut marks, gnaw marks, pathologies, burning, other comments, and measurements. The full database catalog of animal bones that forms the basis of this analysis is published online for free download and reuse in Open Context.<sup>15</sup>

Unless otherwise indicated, all results are based on NISP counts; that is, each specimen is counted as representing one individual. However, in cases where specimens clearly articulated or were paired, they were counted together as one individual in order to avoid intentional overquantification. This method was undertaken on a context-specific level; that is, no attempt was made to pair or articulate bones from different contexts.

## Methodological Challenges

### Working with “Old” Bones

In an ideal situation, the zooarchaeologist conducting analysis on an assemblage should be involved in the project from its inception, helping develop recovery strategies aimed at addressing specific research questions, overseeing excavation of faunal specimens, and undertaking immediate analysis. This is rarely the case, however, so zooarchaeologists have developed ways of dealing with “old” bones that excavators collected and stored for future analysis. Analyzing an old assemblage involves an additional step, ensuring that the assemblage has “integrity.” That is, does the analyst know (or can he or she infer) enough about the assemblage to confidently move ahead with analysis? One of the greatest concerns involves recovery and curation methods: Was the assemblage hand-picked or sieved? Did excavators only recover large, easy-to-spot bones? Were all bones bagged, labeled, and stored?

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13 Boessneck 1969.

14 Grigson 1982.

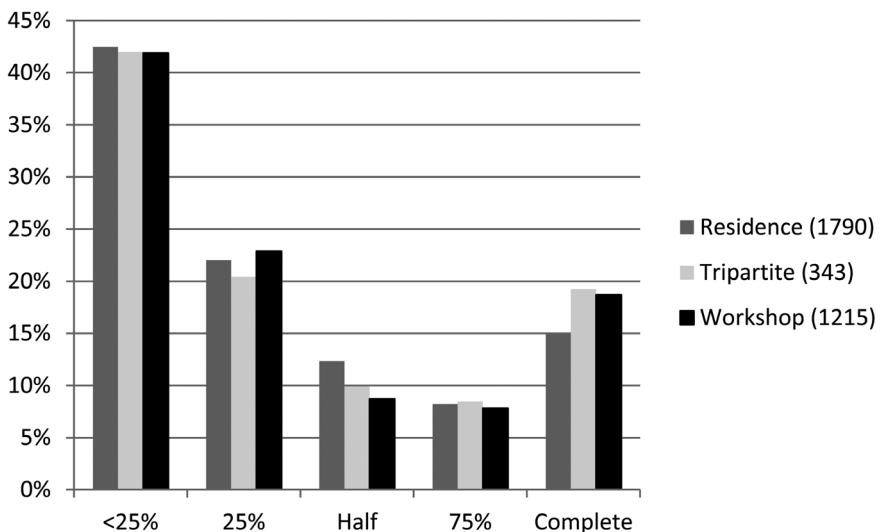
15 Kansa 2013.

For the Poggio Civitate assemblage, we assessed the assemblage's integrity by performing a series of tests comparing specimens across excavation areas and excavation years, as follows:

**Occurrence of non-diagnostic bones:** A high proportion of bones that cannot be identified can be indicative of careful recovery, where most fragments were collected, regardless of their size or appearance. The faunal assemblages from each of the three main areas of Poggio Civitate contain about 35% unidentified fragments. This suggests that collection strategies were relatively consistent across the site and across the many decades of excavation. That is, though the Residence was mainly excavated in the 1970s and the Workshop in the 2000s, the similar ratio of diagnostic to non-diagnostic specimens suggests similar preservation and collection strategies, making the areas comparable.

**Differential discard:** The specimens across all areas show minimal damage from natural taphonomic processes, such as weathering and gnawing (less than 2% of the specimens displayed evidence of carnivore or rodent gnawing).

**Fragmentation:** If excavators across the many decades of fieldwork at Poggio Civitate were preferentially selecting certain bones (such as large or complete bones) over others (small or fragmented bones), we would see a difference in the amount of fragmentation by area (since each area was excavated in a different decade). On the contrary, there is a remarkable similarity in the proportion of different fragment sizes by area (Fig. 1).



**Fig 1:** Fragmentation of all specimens by area, showing percentage of original skeletal element remaining (based on Kansa data only).

**Occurrence of bones of different sizes:** A simple test for differential preservation and/or recovery of elements of different size is the occurrence of the phalanges. In cattle, sheep, and goats, the first phalanx is about 30% larger than the second phalanx. Since they are adjacent bones that are not meat-bearing, we may expect them to be discarded still articulated, and thus likely to be found in the same deposit. Furthermore, since they are of relatively equal density, we would expect them to survive equally well in the same deposit. In a hand-picked assemblage, however, we would expect to find more first phalanges than second phalanges because the smaller bones are more often overlooked. Analysis to date shows that in all areas of Poggio Civitate, first phalanges occur at least twice as frequently as second phalanges for cattle, sheep, and goats (Table 1). The one exception is cattle second phalanges, which occur as frequently as first phalanges in the Workshop contexts.

**Table 1:** Occurrence of first and second phalanges for cattle, sheep, and goats in all areas

	Residence #	Tripartite #	Workshop #
<b>Cattle</b>			
First phalanx	49	8	30
Second phalanx	27	2	36
<b>Sheep and Goats</b>			
First phalanx	14	9	38
Second phalanx	1	3	16

Since this is a hand-collected assemblage, we can assume that bones of larger animals such as cattle and deer are overrepresented, in general. However, the various tests above indicate that, over the 45 years of excavation, animal bones were collected rather systematically; that is, the excavators in the various excavation areas did not intentionally select certain elements, species, or sizes over others—at least not to an extent that would cause any obvious bias in the recovered and stored assemblage. As will be presented below, other patterns have emerged from the data analysis, which indicate an unbiased retrieval of specimens (such as the left- and right-side patterning across areas). These further attest to the general integrity of the assemblage and the feasibility of comparisons across areas.<sup>16</sup>

<sup>16</sup> A program of screening was initiated during the summer of 2013 on selected contexts to determine how lack of screening in past excavations may affect our interpretation of the assem-



## Combining Data from Two Analysts

To date, two zooarchaeologists have analyzed portions of the Poggio Civitate assemblage, MacKinnon in 2002 and Kansa from 2011 to the present. The analysts agreed that combining the datasets would be ideal, in order to facilitate analysis. However, affirming their potential to be combined was a critical first step. The majority of the 1,500 specimens (NISP) MacKinnon identified came from the Workshop; thus, any differences in identification procedures would affect only this area.

The corpus of specimens identified by each analyst overlapped for a few contexts in the Workshop. The analysts compared their identifications on these 500 specimens in order to test the comparability of the two datasets. Although slight procedural variations existed, the analysts' overall identification and quantification schemes were largely comparable. Two differences in their approaches emerged:

- MacKinnon identified more specimens as cattle, whereas Kansa identified them as large mammals or, in a few instances, red deer.
- Kansa refit/positioned/paired tooth fragments and loose teeth from each bag of specimens in order to minimize overcounting. Where teeth did not obviously come from one mandible or maxilla, MacKinnon counted all fragments individually. This difference in recording methodology affects quantification, where, for example, four fragments from one pig mandible were counted as “1” by Kansa and as “4” by MacKinnon.

These differences reflect the aims of analysis: while MacKinnon was on site for less than one week and focused on providing a general overview of the faunal assemblage, Kansa came in with a longer-term approach aimed at finer-grained analysis over multiple field seasons. These results caution us to consider a possible overinflation of cattle and pig numbers, as well as a slight underrepresentation of deer, in the Workshop contexts. We can account for the overinflation of pig counts by excluding loose teeth in comparisons of relative proportions of taxa.

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blage. Results of this screening experiment will be presented with future analytical results from the continuing zooarchaeological investigations at Poggio Civitate.

## The Faunal Assemblage

The Orientalizing period faunal assemblage from Poggio Civitate identified to date consists of taxa common for this period and region (Table 2). It is dominated by cattle, pig, sheep, goats, and a small proportion of birds and wild animals. Because none of the contexts was sieved, we are certainly missing the remains of fish, small mammals, birds, and young animals—that is, small or friable remains.

**Table 2:** Taxa identified in all areas (showing NISP, number of identified specimens)

	Residence #	Residence %	Tripartite #	Tripartite %	Workshop #	Workshop %
<i>Bos taurus</i> (Cattle)	501	29%	60	13%	425	19%
<i>Ovis aries</i> (Sheep)	64	4%	25	5%	83	4%
<i>Capra hircus</i> (Goat)	17	1%	4	1%	10	0.5%
<i>Ovis/Capra</i> (Sheep or Goat)	290	17%	87	19%	460	21%
<i>Sus scrofa dom.</i> (Pig)	641	37%	258	55%	1029	47%
<i>Canis familiaris</i> (Dog)	41	2%	6	1%	48	2%
<i>Equus</i> spp. (Indet. equid)	17	1%	1	0.2%	6	0.3%
<i>Cervus elaphus</i> (Red deer)	91	5%	9	2%	26	1%
<i>Sus scrofa</i> (Boar)	42	2.5%	8	2%	23	1%
<i>Lepus</i> spp. (Hare)	4	0.2%	–	–	15	1%
Aves (Birds)	10	1%	6	1%	51	2%
<i>Bos primigenius</i> (Aurochs)	1	0.1%	–	–	–	–
<i>Capreolus capreolus</i> (Roe deer)	2	0.1%	1	0.2%	1	0.05%
<i>Ursus arctos</i> (Brown bear)	1	0.1%	–	–	–	–
<i>Canis vulpes</i> (Wolf)	3	0.2%	–	–	–	–
<i>Vulpes vulpes</i> (Fox)	2	0.1%	–	–	4	0.2%
<i>Felis</i> spp. (Cat)	–	–	–	–	3	0.1%
<i>Meles meles</i> (Badger)	1	0.1%	–	–	1	0.05%

	Residence #	Residence %	Tripartite #	Tripartite %	Workshop #	Workshop %
Testudines (Tortoise, Turtle)	6	0.3%	1	0.2%	11	0.5%
Microfauna	3	0.2%	2	0.2%	3	0.1%
Fish	–	–	–	–	1	0.05%
<b>TOTAL</b>	<b>1737</b>		<b>468</b>		<b>2200</b>	
<b>sheep:goat ratio*</b>	<b>3 : 1 (66)</b>		<b>6 : 1 (22)</b>		<b>7 : 1 (74)</b>	

\* The sheep to goat ratio is calculated based on specific elements deemed by the analysts as most reliable (humerus, radius, ulna, calcaneus, astragalus, metapodials, phalanges 1 & 2), and excluding horn cores. Thus, the raw number of identified sheep and goats presented in Table 2 does not match the ratio presented at the bottom of the table. The sample size is given in parentheses next to the ratio.

Up to 90% of the fauna are domestic in all areas of the site; however, there appears to be a difference in their relative proportions by area. A somewhat higher proportion of cattle, deer, and equid remains is found in the Residence assemblage, a difference that is not due to different collection methods (as discussed above). The Residence assemblage also comprised a greater variety of large wild mammals, including wolf and aurochs. In contrast, the Workshop assemblage contained a greater diversity of birds and smaller wild mammals than the other areas.

In the following section, we present analytical results by taxon and highlight any differences in their occurrence in the three areas of the site.

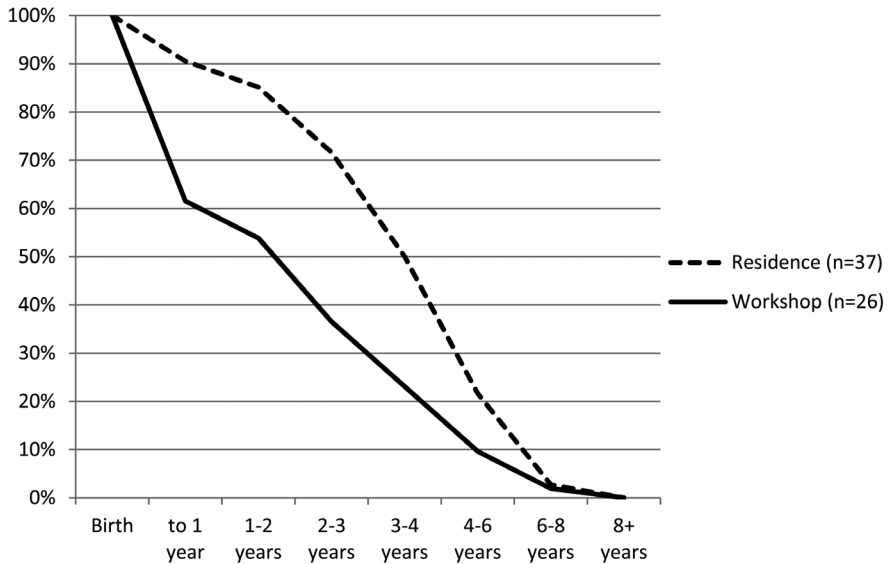
## Sheep and Goats: Secondary Products and Patterned Distribution

Sheep and goats, combined, make up about one quarter of the assemblage of all three areas (see Table 2) at Poggio Civitate, but the ratio of sheep to goats is remarkably different in the Residence (3:1) compared to the Workshop (7:1).<sup>17</sup> This difference may reflect the location of butchery activities or differential access to

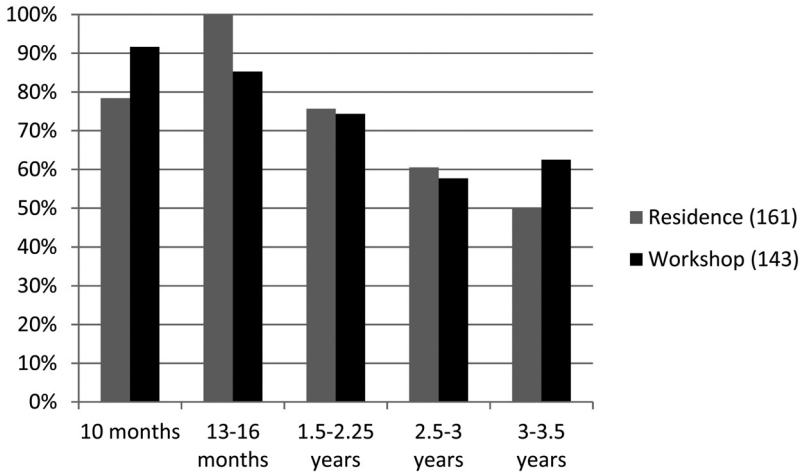
<sup>17</sup> The bones of sheep and goats are notoriously difficult to distinguish. Taken together with the evidence for similar fragmentation across the site, the difference in occurrence of sheep and goat bones in the two areas is further evidence that the patterns we see reflect ancient behaviors, not collection biases.

animals/meat, depending on factors such as availability, dietary preferences, or status.

Differences between the two areas also occur in the age at which the animals were killed. Tooth eruption and wear data show that 40% of sheep and goats in the Workshop were killed before one year of age (Fig. 2). By contrast, tooth data from the Residence indicate that only 10% of the individuals were young animals, the majority being killed once they reached prime-age (c. two–three years) and older. However, when we turn to fusion data from sheep and goat long bones, the picture becomes more complex. Fusion data show a very small number of lambs/kids in the Workshop, and more young animals in the Residence (Fig. 3) than indicated by the tooth data. Could it be that the very young animals were butchered in the Workshop, their heads left behind (thus, the tooth data), and their meaty parts sent elsewhere, such as the Residence (thus, the long bone fusion data)? Though this is a compelling explanation, it is not supported by body part distribution across the site, which shows a relatively equal proportion of body parts occurring in all areas (Table 3). Clearly, complexities existed in the distribution of meat across the site.



**Fig. 2:** Survivorship for sheep and goats (combined), based on mandibular tooth eruption and wear data.



**Fig. 3:** Mortality of sheep and goats (combined), based on bone fusion data (showing percentage of fused bones in each age category).

**Table 3:** Body parts by area (NISP) for the primary meat animals

<i>Cattle</i>	Residence	Tripartite	Workshop
Head	21%	19%	18%
Back	19%	32%	31%
Forelimb, Upper	6%	7%	5%
Hindlimb, Upper	10%	7%	13%
Forelimb, Lower	7%	14%	5%
Hindlimb, Lower	10%	5%	7%
Feet	26%	16%	22%
<i>Total Cattle Specimens</i>	733	74	272
<i>Pig</i>	Residence	Tripartite	Workshop
Head	33%	32%	33%
Back	8%	16%	12%
Forelimb, Upper	16%	8%	9%
Hindlimb, Upper	14%	7%	7%
Forelimb, Lower	11%	6%	10%
Hindlimb, Lower	5%	7%	5%

Feet	13%	24%	24%
<i>Total Pig Specimens</i>	692	184	558
<b>Sheep/Goat</b>	<b>Residence</b>	<b>Tripartite</b>	<b>Workshop</b>
Head	16%	14%	18%
Back	14%	24%	28%
Forelimb, Upper	8%	9%	7%
Hindlimb, Upper	15%	10%	13%
Forelimb, Lower	10%	8%	9%
Hindlimb, Lower	3%	4%	4%
Feet	9%	7%	12%
<i>Total Sheep/Goat Specimens</i>	523	138	509

Note: This table is meant to show broad differences (or similarities) between the areas for each major domestic taxon. NISP has been shown to be a sufficient measure for such analyses, generally mirroring the results provided by other methods of quantification, such as MNE, MAU, and MNI (see Grayson and Frey 2004).

Curiously, an interesting pattern surfaced during analysis, where right-sided ulna bones outnumbered their left-sided counterparts in the Residence and Tripartite Building, while left-sided forelimb bones dominated the Workshop assemblage (Table 4). The exact significance of this is puzzling, and though it could relate to patterned distribution of split sides of a carcass or to ritualized meat consumption, interpretation must await larger sample sizes as we continue our work on this assemblage.<sup>18</sup>

**Table 4:** Identification (NISP) of left- and right-sided elements by taxon and area. Increased sample sizes will help clarify whether differences are statistically significant.

Residence	Cattle		Sheep/Goat		Pig	
	Left	Right	Left	Right	Left	Right
Astragalus	15	12	2	1	7	6
Calcaneus	12	21	8	8	12	7
Femur	3	5	5	4	8	9

<sup>18</sup> For an overview of left/right patterning in ritual faunal assemblages from Greek and Roman sites, see MacKinnon 2010a.

	Cattle		Sheep/Goat		Pig	
Humerus	7	8	21	17	33	37
Pelvis	9	9	11	14	18	14
Radius	6	7	25	20	13	9
Scapula	8	4	5	6	19	19
Tibia	7	8	19	17	20	21
Ulna	4	8	1	13	20	30
<b>Tripartite Building</b>	<b>Left</b>	<b>Right</b>	<b>Left</b>	<b>Right</b>	<b>Left</b>	<b>Right</b>
Astragalus	0	2	4	3	1	2
Calcaneus	0	1	3	3	4	7
Femur	1	1	3	1	6	3
Humerus	2	0	2	6	10	5
Pelvis	0	1	2	3	7	7
Radius	2	1	7	5	7	4
Scapula	0	1	5	0	5	7
Tibia	0	0	6	4	2	3
Ulna	1	1	1	3	6	6
<b>Workshop</b>	<b>Left</b>	<b>Right</b>	<b>Left</b>	<b>Right</b>	<b>Left</b>	<b>Right</b>
Astragalus	5	6	6	8	14	14
Calcaneus	7	2	11	11	11	11
Femur	16	7	6	8	16	12
Humerus	11	5	21	8	34	31
Pelvis	11	12	10	16	19	21
Radius	4	4	37	20	26	18
Scapula	4	4	8	7	20	16
Tibia	9	9	20	28	22	23
Ulna	2	2	9	3	29	17

The age data for sheep and goats support a variety of management aims. A cull of juveniles less than one year old, as the tooth-wear data show for the Workshop (see Fig. 2), fits with an economy exploiting milk products. In this scenario, lambs/kids are culled to make the lactating females available for milk production

and for yogurt and cheeses. However, the maintenance of a significant number of animals beyond the point of maximum growth, as the tooth-wear data show for the Residence, fits with an interpretation of wool exploitation. This is supported by the 1,000+ objects (whorls, loom weights, and spools) excavated at the site that point to a wool industry operating during the Orientalizing period.<sup>19</sup>

Though the extent of the industry is not yet understood, this has been deemed an “inordinate quantity”<sup>20</sup> that makes Poggio Civitate a specialized textile production site that carried out textile production on a scale “significantly larger than that needed for domestic consumption.”<sup>21</sup> If textile production involving wool was carried out on a large scale (beyond the household), how might this be reflected in the zooarchaeological record? Redding has established models for cull patterns among sheep and goats resulting from the various management goals of meat, milk, and wool.<sup>22</sup> The pattern to date observed at Poggio Civitate does not fit with a strategy having the primary aim of wool production, in which case we would expect to see a large number of older individuals. A predominance of adult females among bones that could be sexed (a 3:1 ratio, based on 16 right female and 6 left male pelvis fragments) supports a mixed strategy, where females were kept to adulthood for milk and probably wool, young males killed for meat and to free up the lactating ewes, and some males, most likely castrates, kept to adulthood for wool. In sum, the data suggest that wool exploitation was likely part of a complex economy that also involved meat and milk products, onsite butchery, and distribution at a local scale. However, since the sex ratio is based on a very small sample size, these preliminary observations will benefit from further analysis.

It is very important to consider the animal management-related activities that may not leave evidence in the archaeological record. The presence of all parts of the carcass on site indicates that the people of Poggio Civitate had direct access to live animals (that is, the sheep and goats arrived at Poggio Civitate on hoof). However, if textile production involving wool was carried out on an industrial scale at Poggio Civitate,<sup>23</sup> the faunal data currently do not support sufficient numbers of sheep for such an industry. Rather, the current caprine dataset supports local, multi-use herds providing meat, milk, and wool. It may be the case, however, that some wool arrived at the site already shorn from the sheep, or that sheep passed through the site only to be shorn and thus left no trace in the

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<sup>19</sup> See “textile-related objects” in Tuck 2013.

<sup>20</sup> Gleba 2007, 5.

<sup>21</sup> Gleba 2000, 105.

<sup>22</sup> Redding 1981.

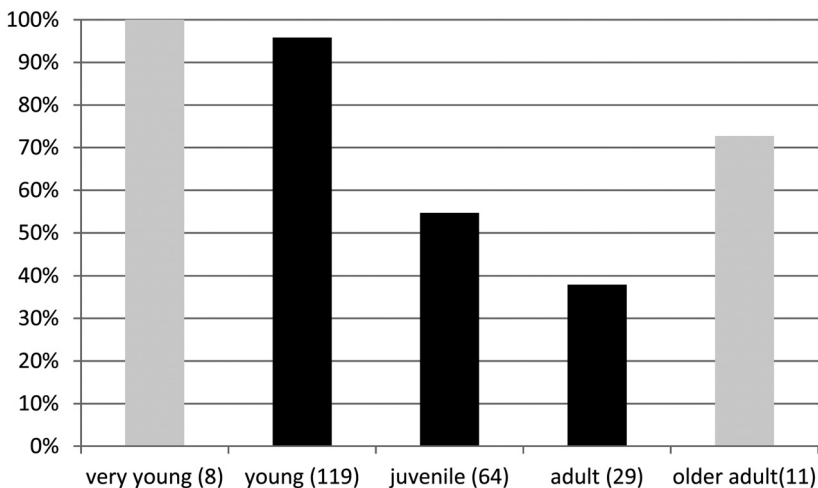
<sup>23</sup> Gleba 2000; 2007.



zoarchaeological record. That is, the wool industry may have involved a separate sequence of activities from meat acquisition. We will continue to investigate this matter as we collect additional data from the Residence and Workshop.

## New Light on Etruscan Cattle

Cattle occur frequently in the assemblages from the three areas in question, ranging from 13% in the Tripartite Building to 29% in the Residence (see Table 2). It is generally accepted that cattle were maintained as plough and traction animals throughout the Mediterranean at this time, and that they were mainly eaten only after they were mature.<sup>24</sup> The large Poggio Civitate cattle dataset helps us test this common interpretation. Somewhat surprisingly, the data for cattle age at slaughter, based on long bone fusion, do not support cattle as primarily labor animals. Fusion evidence shows that over 50% of cattle were slaughtered before they reached prime age (Fig. 4). This does not support a focus on labor animals, where we would expect to see mostly adult or old individuals. There is insufficient tooth data at present to contrast with the patterns observed on bone fusion.



**Fig. 4:** Cattle mortality, based on bone fusion data (showing percentage of fused bones in each age category). The first and last categories are deemphasized because of their small sample sizes.

<sup>24</sup> MacKinnon 2004; Becker 2007.

Thus, though the Poggio Civitate cattle may have been used for labor, the data show that labor was not their main purpose, since so few of them survived into adulthood. It seems that their primary purpose was for beef consumption. De Grossi Mazzorin's survey of Etruscan faunal assemblages from central Italy noted that cattle were frequently kept to adulthood.<sup>25</sup> However, of ten sites presented by De Grossi Mazzorin, nine had assemblages numbering fewer than 1,000 (and most fewer than 500) identified specimens. Whether exploitation of young cattle is peculiar to Poggio Civitate, or reflects a broader Etruscan practice that has not been observed because of a lack of data remains to be seen upon analysis of larger assemblages. It may be the case that use of cattle primarily for labor (the consensus view) comes from later, increasingly urban periods at sites with more intensive agricultural production and regional interactions.<sup>26</sup> The assemblage at Poggio Civitate may reflect a period of less intensified agricultural production or the assemblage may reflect special activities and functions that took place at Poggio Civitate.

Sex data based on cattle pelvises reflect a high proportion of females (only one specimen of 16 sexed to date was from a male). Since sex markers become more pronounced with age, this indicates that most of the adults were cows, while the males were killed when young. Indeed, it makes sense that the females would be kept for breeding and for milking. Since females are not well-suited to the draught (as it expends their energy on labor rather than milk production), sex data provide further evidence that labor was not the primary aim of cattle-keeping at Poggio Civitate.

Finally, there is no pathological evidence in the Poggio Civitate assemblage that points to intensive use of cattle for labor. Only one cattle bone (a second phalanx) has a pathology (exostosis) that may have been affected by activity-related stress. However, this pathology might also be related to older age or large size, a point demonstrated by another specimen (also a second phalanx) with a similar pathology from a red deer, an animal we can be sure was not used for labor.

The consumption of beef, rather than exclusive use of cattle for agricultural labor, fits with Poggio Civitate being a site with an elite presence, where banqueting may have occurred frequently. This presumably would have occurred at the

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<sup>25</sup> De Grossi Mazzorin 2006.

<sup>26</sup> MacKinnon (2010b) notes morphological changes in cattle from sites in Roman Italy that arguably correlate with regional and site-type demands placed upon shifting parameters and dynamics of cattle use and exploitation. Measures to breed thicker-set and more powerful cattle surface in some areas of Roman Italy over time, presumably coinciding with augmented demands for traction and plow animals during these periods.

Residence, where most of the cattle bones and an abundance of banqueting paraphernalia were found. Cattle are not well-suited to the hilly and forested local terrain. The keeping of cattle would have been costly in this landscape. Beef production, then, was an expensive undertaking, and the killing of young cattle a “wasteful” and showy display of wealth. Furthermore, in the absence of refrigeration, the fresh meat would have had to be consumed within a day or two of the slaughter. This would require a large number of consumers—evidence that fits well with banqueting (although preserving beef through salting and drying must also be considered). On a broader scale, the proportion of cattle in faunal assemblages declines from Etruscan to Roman times.<sup>27</sup> While during Etruscan times, cattle may have been markers of wealth, in later periods, as the wool industry escalated, wealth may have taken different forms of expression as cattle numbers decreased.

## Pork Consumption and Distribution

Pigs make up about half of the faunal assemblage at Poggio Civitate and occur in high numbers in all areas of the site (see Table 2). Pigs reproduce frequently, have large litters, and mature quickly, so they are excellent meat producers and clearly contributed significantly to the diet at Poggio Civitate. A high proportion of pigs is consistent with contemporary sites at this time when urbanism was on the rise, but not as high as their numbers reached (c. 70% of specimens) in imperial Roman contexts.<sup>28</sup> Though Poggio Civitate is not an urban center, the fact that it appears to have been self-sufficient may account for the high numbers of pigs.

The overall pattern of pig slaughter at Poggio Civitate indicates that the vast majority of pigs did not survive past about three years of age. A kill-off pattern of most pigs by three years, seen in the tooth eruption and wear data (Fig. 5), is corroborated by the bone fusion data (Fig. 6), where there are almost no fused specimens in the final fusion category (three and one-half years). When we separate the areas, we see that the Workshop area contains a higher proportion of piglets than the other two areas. Given the similar fragmentation and collection practices in all areas, this more likely reflects an ancient practice than a preservation or recovery bias.

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<sup>27</sup> MacKinnon 2009; 2010b.

<sup>28</sup> De Grossi Mazzorin 2004; 2006; MacKinnon 2004.

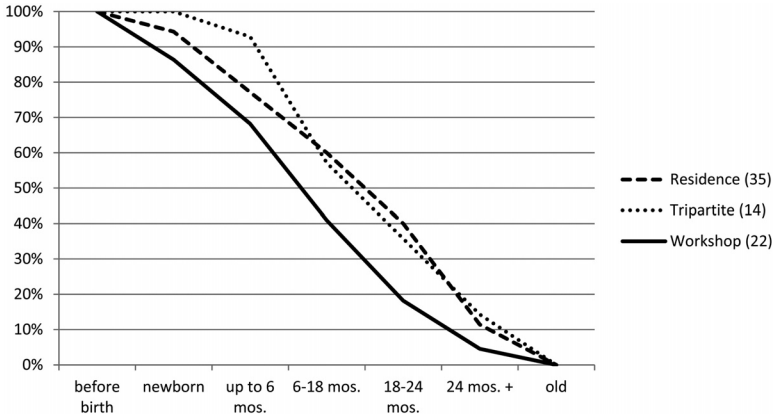


Fig. 5: Pig survivorship, based on tooth eruption and wear data (age categories follow Hongo and Meadow 1998).

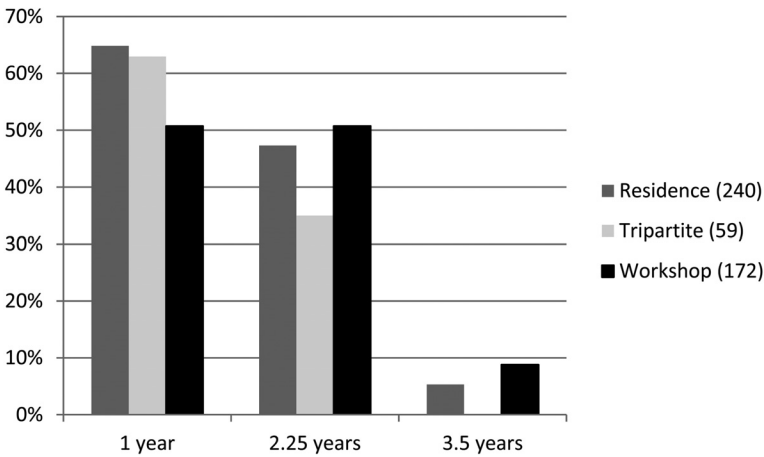


Fig. 6: Pig mortality, based on bone fusion data (showing percentage of fused bones in each age category).

The local landscape is well-suited for pig husbandry, and wild boar are well-documented in the faunal assemblage. However, the focus on prime-age and younger animals suggests that there may have been more planning to the production and consumption of pork than simply letting the pigs run loose in the surrounding area and eating them as needed. Perhaps pigs were acquired elsewhere or were provisioned to the hilltop. All of their parts have been found,

indicating that whole animals were slaughtered and consumed on site. Thus, even if pigs arrived at the site from elsewhere, they came on the hoof.

Though pig remains occur in high numbers in all areas, their portions are unbalanced. The Residence assemblage has more pig elbow joints than any other area (see Table 4). This is the same pattern we saw with the sheep, where bones of the forelimb (the ulna, in particular), occurred in higher numbers in the Residence and Tripartite Building. Furthermore, also like sheep, the pig data show (for the ulna) 30% more right-sided bones in the Residence and twice as many left-sided in the Workshop (see Table 4). This can be interpreted in a variety of non-mutually exclusive ways, such as an elite diet, a very consistent system of carcass processing and distribution, and/or ritual or sacrificial practices at Poggio Civitate.

## Equids

Bones and teeth of equids (horses, donkeys, and their crosses) make up a very small proportion of the Poggio Civitate assemblage. There is a strong spatial pattern in the remains, in that the vast majority of the specimens come from the Residence. The assemblage comprises 24 specimens (see Table 2), mainly loose teeth and foot bones. These are highly recognizable elements, and it is likely that some of the other specimens identified as “large mammal” may also be from equids. None of the specimens could be determined to species, but one fragmented calcaneum is from a large animal that falls well within the size of a horse, while the rest of the measurable specimens are from smaller individuals. As additional specimens come to light with further analysis of the Poggio Civitate assemblage, a database of measurements will give us a better picture of the demographics of the equid population at the site.

The sole equid specimen from the Tripartite Building is a rarely found shed milk tooth. Shed milk teeth are often associated with penning,<sup>29</sup> where the shed tooth would fall out onto the floor. This raises the possibility that the Tripartite Building may have served as a stable at some point during its history of occupation. The importance of horses in elite hunting expeditions is evidenced in the frieze plaques from Poggio Civitate.<sup>30</sup> Their high status and use in ritual is attested in wall paintings, sculpture, and horse burials documented at numerous sites.<sup>31</sup>

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<sup>29</sup> For sheep and goats, see Helmer 1984.

<sup>30</sup> Root 1973.

<sup>31</sup> De Grossi Mazzorin et al. 1998.

The horse would have been a valuable, prestigious animal, making its maintenance and protection important. Perhaps the Tripartite Building served such a purpose.

The scarcity of equid bones in the assemblage and the presence of non-meaty parts suggest that equid meat was not eaten. This is consistent with findings from other contemporary sites.<sup>32</sup> Chop marks were observed on only two equid bones—the distal ends of a tibia and a metacarpus—non-meaty parts of the carcass, suggesting processing for a purpose other than food. Poggio Civitate has numerous examples of bones of large mammals used for tool-making (such as handles).<sup>33</sup>

## Wild Animals

The domestic meat diet was clearly supplemented at times with wild animals, particularly those that would have been readily available in the local forested environment, such as wild boar and deer. Given the diversity of wild fauna in the Poggio Civitate assemblage, hunting occurred frequently and was likely an elite sporting activity, rather than a necessity. It displayed the hunter's prowess, particularly when hunting large and dangerous animals. It is noteworthy that the Residence, in addition to having a large number of cattle specimens, also has a substantial number of red deer (see Table 2)—a formidable animal that would have brought prestige on its slayer, and that would have provided an abundance of meat for a banquet. Indeed, deer feature commonly in the iconography of objects and architectural elements found at the site. Red deer antler was also a common raw material, as evidenced by the nearly 150 fragments of worked (sawn, polished, carved) antler thus far documented from excavations at the site.<sup>34</sup> The deer elements identified to date include, in addition to antler, bones from meat-bearing and non-meat-bearing parts of the body (Table 5), indicating their use for food in addition to raw materials.

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<sup>32</sup> De Grossi Mazzorin et al. 1998.

<sup>33</sup> Our definition of refuse from food processing and consumption is based on a series of factors, including the type and location of cut/chop marks on meat-bearing bones and bone fragmentation. We distinguish this from bone-working debris in that the latter usually comprises non-meat-bearing elements (such as metapodia, antlers, and distal tibiae) that have cleanly chopped or sawn surfaces, polished surfaces, or surfaces in the process of being worked into a different shape.

<sup>34</sup> For a list of worked antler specimens from Poggio Civitate, see: <http://opencontext.org/sets/Italy/Poggio+Civitate?projID=DF043419-F23B-41DA-7E4D-EE52AF22F92F&q=antler>

**Table 5:** Red deer (*Cervus elaphus*) elements identified to date from all areas at Poggio Civitate. The large number of bones of the lower limb may be due to the fact that they are more often complete and thus easier to identify (while fragmented upper limb bones would more likely be identified as “large mammal”).

Element	Residence	Tripartite	Workshop
<b>Head</b>			
Antler	3	1	2
Cranium, Maxilla, Teeth	4		
Mandible, Teeth	2		2
<b>Upper limb</b>			
Femur	2		
Humerus	1		
Pelvis	5		1
Radius, proximal	2		1
<b>Lower limb / Feet</b>			
Radius, distal	1	1	1
Tibia, distal	4		2
Carpal, Tarsal	24		3
Metacarpal, Metatarsal	20	3	3
Phalanx 1, 2, 3	23	4	11

The Residence is the only area with specimens of wolf, bear, and aurochs (see Table 2). The wolf specimen was left- and right-pairing jaws, possibly attached to a skin. The Workshop has the highest diversity of fauna, particularly birds (see Table 2). This fits with the variety of activities presumably going on in the Workshop, among which appears to have been pelt-making, evidenced by articulating fox and hare paw bones, as well as crafts possibly using feathers from a variety of birds, including pigeon, duck, and eagle, which are all represented almost exclusively by bones associated with the wing.

## Conclusions

Dealing with a site that likely had elite, ritualized, as well as everyday domestic and industrial components is both a challenge and a great opportunity. Over a

relatively small area and a short time period, we must attempt to tease out these various elements, which may have distinct signatures but which also are highly interrelated. The initial analysis we present here paints an overall picture of a mixed animal economy that was likely self-sufficient (that is, all animal parts and ages are present and there is no evidence that specific animals, ages, or cuts were obtained from a market). Within the site, there is compelling evidence of distribution of particular cuts of meat among the different functional areas of the site. The data we present fit well with the Residence being a place of elite activities, such as hunting and banqueting, as evidenced by the high number of banqueting items recovered in this context, and the Workshop being a place where non-elite, manufacturing-related activities took place. These distinctions suggest that there was a great deal of complexity even within the different areas of the site. It may be that the short-lived occupation (just a few generations) and the sudden destruction and rebuilding over the Orientalizing period buildings has resulted in less disturbance of cultural materials than might be expected. It is encouraging that the faunal data already have added some new insights into life at Poggio Civitate beyond those gleaned from studies of artifacts and architecture.

We will continue to analyze the backlog of Poggio Civitate faunal remains and will add to it an assessment of the zooarchaeological materials recovered from current excavation campaigns at the site. A primary aim of current fieldwork is to set up a sieving test case in the Workshop in order to ascertain the amount of material overlooked in earlier years when sieving was not practiced. We expect to find more remains of fish, small birds, and very young animals than in the historically hand-picked assemblage. Another immediate goal is to analyze a larger sample of material from the Tripartite Building. Given the clear differences observed between the Residence and Workshop assemblages, the Tripartite Building assemblage may be instrumental in helping us understand the function of the Tripartite Building. However, to date, the faunal assemblage is too small (c. 500 specimens) to show any clear patterns. A larger sample size from this area could be extremely informative.

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