

Some considerations about the evolution of the animal exploitation in Central Italy from the Bronze Age to the Classical period

by

Jacopo De Grossi Mazzorin

Abstract:

This paper follows the work presented to the Conference “From Huts to Houses. Transformations of Ancient Societies”. At that time I analysed how changes in the social order of a population condition and modify the sample of faunal remains. In the present work I underline the specific role of pig and sheep/goat in the economy of various settlements from the Bronze Age to Medieval times in Central Italy. In the Bronze and Iron Age there was an integration between agricultural and animal herding, in the Roman times the changing demographic conditions caused pork to become and important part of the diet. This tendency reaches its peak in the full Imperial period. After the end of the Roman period pig decreased a lot, maybe because of the decrease in population that happened in Rome after Alaric’s sack in 410 AD. In the Middle Ages Rome showed a typical framework, characterised by the presence of large destroyed part of the town alternated with kitchen-gardens, vineyards and uncultivated spaces for animal keeping. The percentages of pig progressively decreased and the sheep-keeping increased again.

This paper follows the work presented to the Conference “From Huts to Houses. Transformations of Ancient Societies”, carried out in 1997 at this Institute.¹ At that time I analysed how changes in the social order of a population condition and modify the sample of faunal remains. The sample area under investigation is Central Italy along the Tirrenic coast, in particular Etruria and *Latium Vetus*, between the Middle Bronze Age and the Roman Imperial. This period documents the changes from more or less fortified villages of huts to true cities with ever more evolved urban features. The aim of this paper is to examine the animal exploitation and particularly the role of sheep and pig keeping.

As I have already written in the preceding paper, hunting in the Middle and Late Bronze Age, which was mostly confined to deer and wild boar, seems to be tied chiefly to necessity and local conditions (*Table 1*). In many of the settlements where it is possible to follow the development over time of this activity, one observes a gradual decrease. If we analyse, on the contrary, the percentage of the three main kinds of domestic animals (cattle, sheep and goats and pigs) over time we can observe how during the Middle and Late Bronze Age in Southern Etruria there has been a change in the practices of animal breeding (*Table 2*). Although there was an

integration between agricultural and animal herding, the former was generally predominant in the Middle Bronze Age. A clear increase in herding activity is seen in the Final phase of the Bronze Age. Furthermore, in most settlements (Pitigliano, Luni sul Mignone, M. Rovello) in which it is possible to follow the chronological development of animal rearing, it is possible to observe an increase in the sheep and goats in the more recent phases. In analysing all the settlements, an increase is evident in the number of sheep and goats from 23% in the Middle Bronze Age, to 34% in the Late Bronze Age and 49% in the Final Bronze Age. The increase in the flocks during the Final Bronze Age might also be explained by the social changes that took place during this period. Perhaps we are observing an initial individual accumulation of domesticated animals. The surplus of sheep (the *pecus* of the Latin world) could have formed part of the personal wealth of the most affluent social classes. During all the phases of the Bronze Age sheep and goat are primarily kept for meat production. In fact most of animals are killed at the age of 2-3 years when they reach the optimum point in weight-gain.

To better understand the aim of the animal breeding it is useful to analyse the dental eruption, replacement and wear. Its sequence is in fact longer and more precise than the epiphyseal fusion. To all the mandibular remains has been rigidly applied the registration method set forth by S. Payne (1973). This method is based on the “registration” of the condition of the mandibular teeth at the moment of the animal’s death, namely their condition in their original location or, when sprouted, their wear level. These elements have been used to compile the *Fig. 1*, which shows the mortality curve for some settlements based on the survivors percentage for each age-class. For the Bronze Age we can see the case of Vejano: his curve permits us to hypothesise that in this settlement the meat production surely was the primary aim. In fact almost 60% of the animals were killed at the age of 2 or 3, this means that a higher quantity of meat was produced with the lowest production costs. Since the economic and working effort would not have been rewarded by

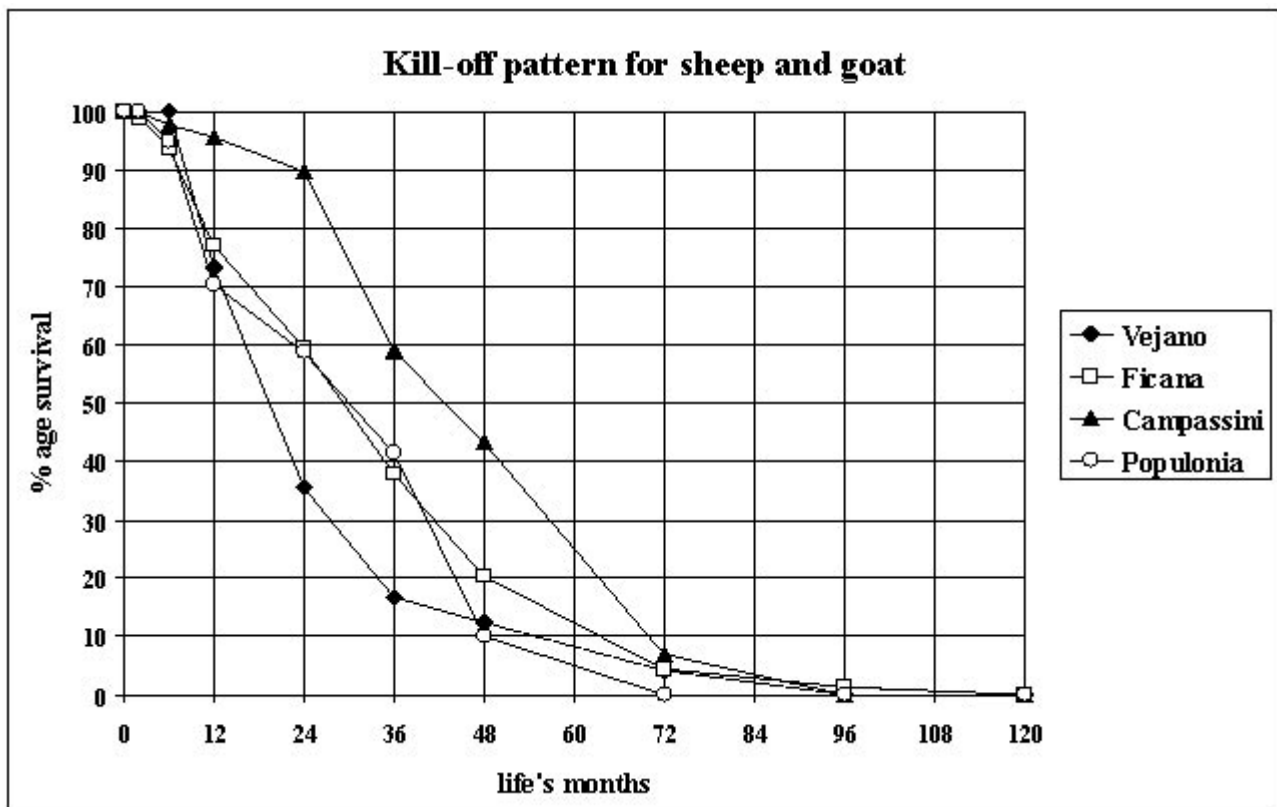


Fig. 1.

an equivalent meat yield, it was not convenient to keep these animals alive for a longer period. Moreover to these should be added the animals killed during the first 12 months; these animals could have been slaughtered to obtain more precious cuts of meat.

During the 9th century BC hunting of big wild mammals (as red deer and wild boar) followed to be tied chiefly to necessity and local conditions (Table 3). From the 8th century BC hunting was rarely practised, especially in the big centres: Tarquinia, Cerveteri, Roselle and Populonia. In this later is exercised prevalently on little animal like birds and hares. From this it is possible to suggest that hunting is already a non-indispensable activity that only the affluent social classes can have access to. During the 9th century BC, in general, ovicaprids are still more represented over other domestic animals and their percentages are more or less the same of the previous period (Table 4). From the 8th century BC to the end of archaic period the ovicaprid percentage decreases until 32% but meanwhile substantial changes regarding urban features were happened. In fact, from the 8th to the 6th century BC, in accordance with the first developing of urban centres we can see that pig breeding was increasing. In the most ancient settlements the percentages vary 20% and 35% with an average of 32%. In the more recent contexts, dated between the 7th and 5th centuries BC, the percentages are between 30 and 40 % (average = 35%). Between the 5th and the 3rd centuries BC pig breeding increased substantially. The changing demographic conditions caused pork to become an important part of the diet. For example in Populonia in the 3rd century BC pigs make-up approximately 47% of the sample.

It is interesting to note that in this phase for the first time the mortality curves of the sheep and goats show a particular attention to the production of wool: in fact many adult animals, older than 3 years of life, are present. In some centres the large number of adult and senile animals present would not be justified by their keeping for their primary use for milk and meat. This type of herding, for example, is well represented in the settlements of Monteriggioni "Campassini. (VIII-VII centuries BC) and Ficana (VIII-VI centuries BC) (Fig. 1).

In the Roman period wild animals are almost absent and the domestic pig is highly predominant. The changing demographic conditions caused pork to become an important part of the diet. To better understand the increase in pork production from the formation of cities onward it is enough to look at the percentage of the remains of domesticated animals in some of those archaeological sites in Central Italy where the animal bones have been studied (Tables 4-6). This tendency reaches its peak in the full Imperial period. Regarding this specific instance, the increase in research on Roman urban contexts (*Caput Africae*, *Meta Sudans*, Quirinale, Foro Transitorio, Arch of Constantine and *Aqua Marcia*) in these last years has caused an increase, both in quality and quantity, of the documents available. This has made possible the understanding of some aspects of the food supply of the urban community during the beginning of the Imperial Age. In all the samples (Table 6), the most frequent animal is without a doubt the pig, with percentages over 70% of the remains. During this time the relevant demographic increase in quite limited areas, and the heightened meat demand can be met only by an

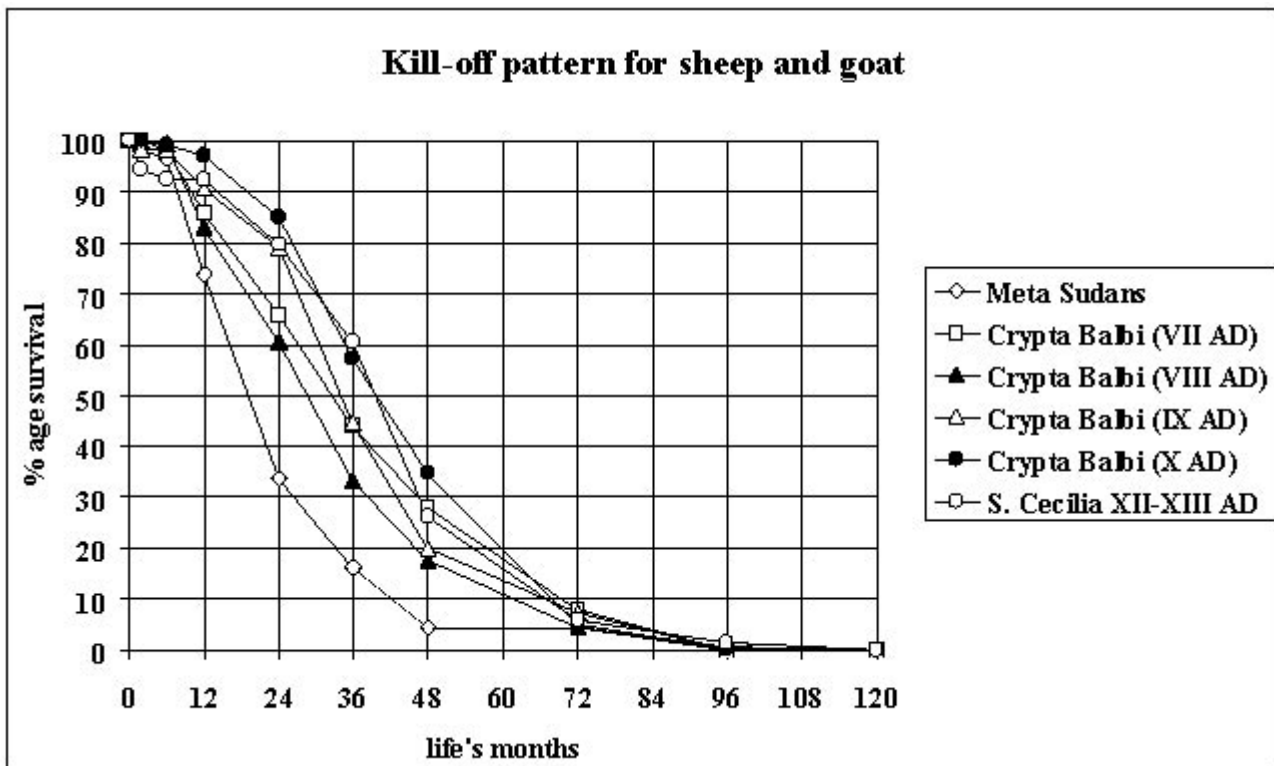


Fig. 2.

intensive breeding of such a prolific and low production-costs animal like the pig. It so happened that since the 3rd century AD common people received free pork from government. Neighbouring country and other distant provinces supplied ancient Rome with this. In Roman Republic and ancient Imperial regions of Northern Italy were the largest meat producer and exporter, while as from the 2nd century AD provinces of Southern Italy, like *Brutium*, *Sannium*, *Campania* and mostly regarding pork production *Lucania*, supplanted them.

After the end of the Roman period pig decreased a lot, maybe because of the decrease in population that happened in Rome after the Alaric's sack in 410 AD. The generous gifts of pork established by *Aurelianus* decreased a lot between the end of the 4th and the middle of the 5th century AD. According to Mazzarino, people who enjoyed free distribution of meat were 320.000 in 367 AD (during the reign of *Valentinianus I*), 120.000 in 419 AD (during the reign of *Onorius*) and finally 140.000 in 452 AD (during the reign of *Valentinianus III*).

Even if these values are not sure nevertheless we know that the decrease in population after Alaric sacked and captured the city of Rome itself, was very strong and followed for all the century. At the time of *Teodoricus* Rome had no more than 200.000 inhabitants and this value decreased further on in the following centuries. Furthermore, the commerce and the food supply of the town, that had already been in a critical situation, stopped. Since the Byzantine Age public food supplies of wheat, wine, oil and meat also stopped.

In the Middle Age Rome showed a typical framework, characterised by the presence of large destroyed part of the town alternated with kitchen-gardens,

vineyards and uncultivated spaces for animal keeping. At *Crypta Balbi*, between the 7th and 10th Century AD, the percentages of pig progressively decreased from 60 to 47%. (*Table 6*). These values could indicate the pork consumption was not the same than during Imperial period although was quite high. The archaeozoological analyses from other contemporary settlements of Central Italy confirm that economies were quite similar to *Crypta Balbi*. Here sheep and goat remains scatter from 28 to 33 %, while in other more recent context of Rome (*S. Cecilia*: 12th – 13th centuries AD) seem to be the principal food supply (50% of the faunal remains).

Regarding the exploitation of animals there are many differences between Roman and Middle Age. In Roman period the mortality curves of sheep and goat show a particular attention to the production of meat (see *Populonia* in *Fig. 1* or *Meta Sudans* in *Fig. 2*). In fact most of the animals are killed at the age of 2-3 years when they reach the optimum point in weight-gain. Moreover, in the sample from *Meta Sudans*, to these should be added a large number of younger individuals. These animals could be slaughtered to obtain more precious cuts of meat. On the contrary in the middle age contexts, as *Crypta Balbi*, *Forum Iulium* and *Forum Transitorium*, a higher number of animals were killed after the 3rd year of age showing an increasing attention to the production of wool (*Fig. 2*). Later, in the sample from *Santa Cecilia*, the attention to the wool production seems to grow. This interest, linked to the predominance of sheep remains in the sample, arrived earlier than historical documents showed only for the following century, when wool manufacturing increased in the town. On this subject it must be pointed out that from the second half of the 13th century AD “lanaioli o lanistae” (textile

workers), with “macellai o bovattieri” (butchers and cowherds), were very active in the political and economic life of the town. However we cannot exclude that maybe the sample from Santa Cecilia is linked to a restricted area of the town. We know that friars (“Umiliati”) of Santa Cecilia were wool merchants and owned land and farmer’s houses in Roman campain from that they probably kepted all animals for food supplies.

Jacopo De Grossi Mazzorin
Università degli Studi di Lecce - Dipartimento di Beni Culturali.

¹ De Grossi Mazzorin 2001.

Bibliography

- Barker 1976 G. Barker, ‘Animal husbandry at Narce’, in T.W. Potter (ed.), *A Faliscan Town in South Etruria: Excavations at Narce 1966-71*, London 1976, 295-307.
- Barker 1982 G. Barker, ‘The Animal bones’, in ‘The Schola Praeconum 1: the coins, pottery, lamps and fauna’ edited by D. Whitehouse, G. Barker, R. Reece, and D. Reese, *PBSR* 50, 1982. 81-91, 96-99.
- Bartoloni *et al.* 1997 Bartoloni G., Cianferoni, G.C., De Grossi Mazzorin, J., ‘Il complesso rurale di Campassini (Monteriggioni): considerazioni sull’alimentazione nell’Etruria settentrionale nell’VIII e VII secolo a.C.’, in *Aspetti della Cultura di Volterra etrusca fra l’età del Ferro e l’età ellenistica e contributi della ricerca antropologica alla conoscenza del Popolo Etrusco, Atti del XIX Convegno di Studi Etruschi ed Italici* (Volterra, 15-19 ottobre 1995), 1997, Firenze 93-127.
- Caloi & Palombo 1986 L. Caloi, M.R. Palombo, ‘La fauna dell’insediamento di Monte Rovello (fine del XII-IX secolo a.C.) e sue implicazioni paleoeconomiche’, in *La civiltà ‘Protovillanoviana’ dei Monti della Tolfa*, Allumiere 1986, 88-103.
- Caloi & Palombo 1996 L. Caloi, M.R. Palombo, ‘La fauna domestica di L’Elceto (Etruria meridionale)’, *Notiziario del Museo di Allumiere* 8, 1996, 35-59
- Ciampoltrini *et al.* 1991 G. Ciampoltrini, P. Rendini & B. Wilkens, ‘L’alimentazione nell’abitato etrusco di Montecatino in Val Freddana (Lucca)’, *StEtr.* 56, 1991, 271-284.
- Clark 1989 G. Clark, ‘A group of animal bones from Cerveteri’, *StEtr.* 55, 1989, 253-269.
- Corridi 1989 C. Corridi, ‘Analisi preliminare dei reperti faunistici rinvenuti in due scavi archeologici in Roselle’, *StEtr.* 55, 1989, 227-233.
- Cosentino & De Grossi Mazzorin 2000 S. Cosentino & J. De Grossi Mazzorin, ‘Archeozoologia e paleobotanica dell’insediamento protostorico del Borgo di Vejano (VT)’, in N. Negroni Catacchio (ed.), *Preistoria e Protostoria in Etruria. Atti del III Incontro di Studi*, Milano 2000, 447-460
- Costantini *et al.* 1987 L. Costantini, L. Biasini Costantini & S. Scali, ‘Bolsena - Gran Carro’, in *L’alimentazione nel mondo antico. Gli Etruschi*, (catalogo mostra), Roma 1987, 61-70.
- De Grossi Mazzorin 1985a J. De Grossi Mazzorin, ‘I resti faunistici dell’insediamento protostorico di Pitigliano - Mulino Rossi (GR)’, in Aranguren B.M., Pelegrini E., Perazzi P., *L’insediamento protostorico di Pitigliano. Campagne di scavo 1982-83*, Pitigliano 1985, 77-92.
- De Grossi Mazzorin 1985b J. De Grossi Mazzorin, ‘Reperti faunistici dall’Acropoli di Populonia: testimonianze di allevamento e caccia nel III secolo a.C.’, *Rassegna d’Archeologia* 5, 1985, 131-171.
- De Grossi Mazzorin 1989a J. De Grossi Mazzorin, ‘Testimonianze di allevamento e caccia nel Lazio antico tra l’VII e il VII secolo a.C.’, *DialArch*, III serie, anno 7, n.1, 1989, 125-142.
- De Grossi Mazzorin 1989b J. De Grossi Mazzorin, ‘Nota preliminare sulla fauna’, in C. Morselli, E. Tortorici (ed.), *Curia, Forum Iulium, Forum Transitorium* (LSA 14), Roma 1989, 340- 347.
- De Grossi Mazzorin 1992 J. De Grossi Mazzorin, ‘I resti faunistici’, in V. d’Ercole, F. Trucco, ‘Canino (Viterbo) Località Banditella. Un luogo di culto all’aperto presso Vulci’, *Bollettino d’Archeologia* 13-15, 1992, 84-85.

- De Grossi Mazzorin 1995a J. De Grossi Mazzorin, 'Ricerche zooarcheologiche in alcuni insediamenti protostorici dell'Etruria meridionale', in N. Negroni Catacchio (ed.), *Preistoria e Protostoria in Etruria. Atti del II Incontro di Studi*, Milano 1995, 17-26.
- De Grossi Mazzorin 1995b J. De Grossi Mazzorin, 'I resti ossei animali rinvenuti nell'insediamento sommerso del 'Gran Carro' nel Lago di Bolsena (VT)', in Tamburrini P., *Un abitato Villanoviano perilacustre. Il 'Gran Carro' sul lago di Bolsena (1959-1985)*, Roma 1995, 339-351.
- De Grossi Mazzorin 1995c J. De Grossi Mazzorin, 'La fauna rinvenuta nell'area della Meta Sudans nel quadro evolutivo degli animali domestici in Italia', *Atti del I Convegno Nazionale di Archeozoologia, (Padusa Quaderni, 1.)* 1995, 309-318.
- De Grossi Mazzorin 1996 J. De Grossi Mazzorin, 'Resti faunistici', in R. Volpe (a cura di), *Aqua Marcia. Lo scavo di un tratto urbano*, Firenze 1996, 203-214.
- De Grossi Mazzorin 1997 J. De Grossi Mazzorin, 'Analisi dei resti faunistici dall'abitato di Ficana (zone 3b-c)', in J.R. Brandt, *Ficana*, vol. II.1, Roma 1997, 405-423.
- De Grossi Mazzorin, J. 1998a J. De Grossi Mazzorin, 'Analisi dei resti faunistici da alcune strutture di Sorgenti della Nova', in N. Negroni Catacchio (ed.), *Preistoria e Protostoria in Etruria. Atti del III Incontro di Studi Protovillanoviani e/o Protoetruschi. - Ricerche e Scavi*, Firenze 1998, 169-180.
- De Grossi Mazzorin 1998b J. De Grossi Mazzorin, 'L'analisi dei resti ossei animali', in D. Candilio, 'IV. - Roma. - Saggio di scavo nell'aula di 'S. Isidoro in Thermis', *NSc (?)*, anni CCCXCIII-CCCXCIV, serie IX, vol. VII-VIII, 1996-97 (pr. 1998), 416-425.
- De Grossi Mazzorin 2001 J. De Grossi Mazzorin, 'Archaeozoology and Habitation Models: from a subsistence to a productive economy in Central Italy', in J. R. Brandt and L. Karlsson (eds.), *From huts to houses. Transformations of Ancient Societies (Proceedings of an International Seminar organized by the Norwegian and Swedish Institutes in Rome, 21-24 september 1997)*, (ActaRom 4° 56 = ActaAArtHist 4°, 13), 2001, 323-330.
- De Grossi Mazzorin & Minniti 1995 J. De Grossi Mazzorin & C. Minniti, 'Gli scavi nell'area della Meta Sudans (I sec. d.C.): l'industria su osso', *Atti del I Convegno Nazionale di Archeozoologia, (Padusa Quaderni, 1.)* 371-374.
- De Grossi Mazzorin & Minniti 2001 J. De Grossi Mazzorin & C. Minniti, 'Reperti ossei', in M.S. Arena, P. Delogu, L. Paroli, M. Ricci & L. Sagui, L. Vendittelli (eds.), *Roma dall'antichità al medioevo. Archeologia e Storia nel Museo Nazionale Romano. Crypta Balbi*, Roma 2001, 328-330.
- De Grossi Mazzorin & Minniti in press. J. De Grossi Mazzorin & C. Minniti: "Lo studio dei resti animali di s. Cecilia in Trastevere: un contributo alla storia del consumo alimentare a Roma tra il XII e il XIII secolo d.C.", *RendPontAcc*, in press.
- Gejvall 1967 N.G. Gejvall, 'Esame preliminare del materiale osseo reperito negli scavi effettuati a Luni (Provincia di Viterbo, Comune di Blera) a cura dell'Istituto Svedese di Studi Classici in Roma', in C.E. Östenberg, *Luni sul Mignone e problemi della preistoria in Italia* (ActaRom 4°, 25), 1967, 263-276.
- Gejvall 1982 N.G. Gejvall 'Animal remains from zone A in Acquarossa', in M. -B. Lundgren & L. Wendt, *Acquarossa III: zone A'* (ActaRom 4° 37:3), 1982, 68-70.
- IPU 1968 Istituto di Paleontologia Umana (=IPU). 'Reperti ossei e malacologici', in 'Ostia I: Le terme del nuotatore', (StMisc 13), eds. A. Carandini et al., Roma, 122-124.
- IPU 1973 Istituto di Paleontologia Umana (=IPU). 'Reperti ossei e malacologici', in 'Ostia III'. (StMisc 21), eds. A. Carandini et al., 649-650.
- IPU 1977 Istituto di Paleontologia Umana (=IPU). 'Reperti ossei e malacologici', in 'Ostia IV' (StMisc 23) eds. A. Carandini & C. Panella, Roma, 273-275.
- King et al. 1985 A.C. King, P.A. Rhodes, K. Rielley & K.D. Thomas, 'I resti animali', in A. Ricci (ed.) *Settefinestre. Una villa schiavistica nell'Etruria romana. La villa e i suoi reperti*, III, Modena 1985, 278-306.
- Lepiksaar 1975 J. Lepiksaar, 'Animal remains', in *Luni sul Mignone, The zone of the large iron age building* (ActaRom 4° 27,2, 2), 1975, 77-86.

- Mc Vicar *et al.* 1994 J. Mc Vicar, C. Backway, G. Clark & R. Housley, '4.2 Agriculture', in C. Malone, S. Stoddart, *Territory, time and State. The archaeological development of the Gubbio Basin*, Cambridge 1994.
- Payne 1973 S. Payne S., 'Kill-off patterns in sheep and goats: the mandibles from Asvan Kale?', *Anatolian Studies* 33, 1973 281-303.
- Placidi 1978 C. Placidi, 'Fauna', in S.M. Cassano, A. Manfredini, 'Torriacaccio (Viterbo). Scavo di un abitato protostorico', *NSc* 32, 1978, 270.
- Sorrentino 1981a C. Sorrentino, 'La Fauna', in *San Giovenale. Excavations in Area B, 1957-1960* (ActaRom 4° 26,2,2), 1981, 58-64.
- Sorrentino 1981b C. Sorrentino, 'La Fauna', in '*San Giovenale. The semi-subterranean building in Area B, 1957-1960* (ActaRom 4° , 26,2, 4), 1981, 85-89.
- Tagliacozzo 1993 A. Tagliacozzo, 'VII - I reperti faunistici', in C. Pavolini (ed.), *Caput Africae, I, Indagini archeologiche a Piazza Celimontana (1984-1988). La storia, lo scavo, l'ambiente*, Roma 1993, 251-278.
- Tagliacozzo 1994 A. Tagliacozzo, 'I resti ossei faunistici di Acquarossa', in '*Acquarossa*' VII, *Trial trenches, tombs and surface finds* (ActaRom 4° 38,7), 1994, 156-165.

Table 1

settlement	date	bibliography	sample size (NISP)	% wild
Luni sul Mignone (A I + I-II)	MBA	Gejvall 1967	1968	1
Pitigliano (str. V)	MBA	De Grossi Mazzorin 1985	41	41.4
Castiglione	MBA	De Grossi Mazzorin in study	201	4.5
Veiano	MRBA	Cosentino, De Grossi Mazzorin 2000	313	15.9 (13.7*)
M. Ingino (pre-midden)	MRBA	Mc Vicar <i>et al.</i> 1994	597	2.8
Narce (ph. I-II)	MRBA	Barker 1976	380	0.2
Banditella	RBA	De Grossi Mazzorin 1992; 1995a	82	0
M. Rovello (liv. 10-9)	RBA	Caloi, Palombo 1986	76	5.2
M. Rovello (liv. 8)	RFBA	Caloi, Palombo 1986	67	1.5
San Giovenale (str. 2)	RFBA	Sorrentino 1981	17	0
M. Ingino (midden)	RFBA	Mc Vicar <i>et al.</i> 1994	11042	0.4
M. Ansciano	FBA	Mc Vicar <i>et al.</i> 1994	2950	0.1
Elceto	FBA	Caloi, Palombo 1996	236	0
Luni sul Mignone	FBA	Gejvall 1967	69	2.9
Luni sul Mignone	FBA	Lepiksaar 1975	267	19.4 (4.8*)
M. Rovello (liv. 7-6)	FBA	Caloi, Palombo 1986	124	2.4
Narce (ph. III-V)	FBA	Barker 1976	1398	0.1
Pitigliano (str. III)	FBA	De Grossi Mazzorin 1985	29	24.1
San Giovenale (str. 3 e 4)	FBA	Sorrentino 1981	153	2.6
Sorg. Nova (Va-Ve)	FBA	De Grossi Mazzorin 1998a	142	4.9
Ficana zona 2	FBA	De Grossi Mazzorin in study	947	1.6
Torrionaccio	FBA	Placidi 1978	219	0

Tab. 1. Percentages of the remains of wild animals in the Bronze Age settlements of Central Italy along the Tirrenic coast. (* without the deer antlers; M=middle; R=recent; F= final; BA=Bronze Age; NISP=number of identified specimens).

Table 2

settlement	date	bibliography	sample size (NISP)	% cattle	% sheep/goat	% pig
Luni sul Mignone (a I + I-II)	MBA	Gejvall 1967	1947	48.5	26.7	24.7
Pitigliano (str. V)	MBA	De Grossi Mazzorin 1985a	24	54.1	12.5	33.3
Castiglione	MBA	De Grossi Mazzorin in study	192	53.7	30.2	16.1
Veiano	MRBA	Cosentino, De Grossi Mazzorin 2000	263	31.5	37.2	31.2
M. Ingino (pre-midden)	MRBA	Mc Vicar <i>et al.</i> 1994	580	17.9	45.7	36.3
Narce (ph. I - II)	MRBA	Barker 1976	379	30.8	53	16.1
Banditella	RBA	De Grossi Mazzorin 1992; 1995a	82	50	36.5	13.4
M. Rovello (liv. 10-9)	RBA	Caloi, Palombo 1986	72	44.4	31.9	23.6
M. Rovello (liv. 8)	RFBA	Caloi, Palombo 1986	66	37.8	46.9	15.2
San Giovenale (str. 2)	RFBA	Sorrentino 1981a	17	29.3	41.3	29.3
M. Ingino (midden)	RFBA	Mc Vicar <i>et al.</i> 1994	10997	11.5	52.6	35.8
M. Ansciano	FBA	Mc Vicar <i>et al.</i> 1994	2946	16.7	67.2	16
Elceto	FBA	Caloi, Palombo 1996	236	34.3	54.2	11.4
Luni sul Mignone	FBA	Gejvall 1967	67	43.2	35.8	20.9
Luni sul Mignone	FBA	Lepiksaar 1975	215	38.6	55.3	6
M. Rovello (liv. 7-6)	FBA	Caloi, Palombo 1986	215	53.4	33	13.4
Narce (ph. III-V)	FBA	Barker 1976	1396	25.6	51.4	23
Pitigliano (str. III)	FBA	De Grossi Mazzorin 1985a	22	45.4	36.3	18.2
San Giovenale (str. 3-4)	FBA	Sorrentino 1981a	149	16.1	54.3	29.5
Sorg. Nova (Va-Ve)	FBA	De Grossi Mazzorin 1998a	135	29.6	45.9	24.4
Ficana (zona 2)	FBA	De Grossi Mazzorin in study	932	33.9	40	26
Torrionaccio	FBA	Placidi 1978	219	20	74	6

Tab. 2. Percentages of the three principal domestic animals (cattle, sheep or goat, pig) in the Bronze Age settlements of Central Italy along the Tirrenic coast. (M=middle; R=recent; F= final; B=Bronze Age; NISP=number of identified specimens).

Table 3

settlement	date	bibliography	sample size (NISP)	% wild
Gran Carro ('65-'66)	IX BC	De Grossi Mazzorin 1995b	214	14
Gran Carro ('80)	IX BC	Costantini <i>et al.</i> 1987	132	32.5
Gran Carro (tot.)	IX BC.	Costantini <i>et al.</i> 1987; De Grossi Mazzorin 1995b	346	21
Cretoncini	IX BC	De Grossi Mazzorin 1995a	206	4.3
Fidene U.P.F.	VIII BC	De Grossi Mazzorin 1989a	251	7.1
Roma - Palatino	VIII BC	De Grossi Mazzorin 1989a	35	0
Campassini	VIII-VII BC	Bartoloni <i>et al.</i> 1997	316	7.2 (2.6*)
San Giovenale (spring-building)	VIII-VII BC	Sorrentino 1981b	696	59.7 (23.6*)
Ficana - zona 3b-c (II)	VIII-VII BC	De Grossi Mazzorin 1989a; 1997	608	1.6
Fidene A	VIII-VII BC	De Grossi Mazzorin 1989a	230	0.4
Roma - Palatino	VII BC	De Grossi Mazzorin 1989a	24	0
Ficana - zona 5a	VII BC	De Grossi Mazzorin 1989a	378	3.1
Ficana - zona 3b-c (II+III)	VIII-VI BC	De Grossi Mazzorin 1989a; 1997	211	2.8
Ficana - zona 3b-c (III)	VII-VI BC	De Grossi Mazzorin 1989a; 1997	504	2.4
San Giovenale (str. 5)	VII-VI BC	Sorrentino 1981a	70	8.5
Acquarossa (zona A)	VII-VI BC	Gejvall 1982	382	2
Acquarossa (trincee)	VII-VI BC	Tagliacozzo 1994	170	1.7
Roselle - scavo Donati	VI BC	Corridi 1989	147	4.7
Roselle - scavo Cyegelman	VI BC	Corridi 1989	54	0
Cerveteri	VI-V BC	Clark 1989	475	0.6**
Montecatino	V BC	Ciampoltrini <i>et al.</i> 1991	282	7
Populonia	III BC	De Grossi Mazzorin 1985b	2020	1.2**

Tab. 3. Percentages of the remains of wild animals in the Iron Age settlements of Central Italy along the Tirrenic coast. (* without the deer antlers; ** without the remains of turtle, fish and mollusc; M=middle; R=recent; F= final; BA=Bronze Age; NISP=number of identified specimens).

Table 4

settlement	date	bibliography	sample size (NISP)	% cattle	% sheep/goat	% pig
Gran Carro (*65-66)	IX BC	De Grossi Mazzorin 1995b	184	35.8	47.8	16.3
Gran Carro (*80)	IX BC	Costantini <i>et al.</i> 1987	89	15.7	50.5	33.7
Gran Carro (tot.)	IX BC	Costantini <i>et al.</i> 1987; De Grossi Mazzorin 1995b	273	29.3	48.7	21.9
Cretoncini	IX BC	De Grossi Mazzorin 1995a	197	30.9	50.7	18.3
Fidene U.P.F.	VIII BC	De Grossi Mazzorin 1989a	233	44.2	38.1	17.5
Roma - Palatino	VIII BC	De Grossi Mazzorin 1989a	35	22.8	22.8	54.2
Campassini (phase I)	VIII BC	Bartoloni <i>et al.</i> 1997	43	18.6	34.8	46.5
San Giovenale (spring-building)	VIII-VII BC	Sorrentino 1981b	280	62.1	15.7	22.1
Ficana - zona 3b-c (II)	VIII-VII BC	De Grossi Mazzorin 1989a; 1997	605	26.8	37.7	35.4
Fidene A	VIII-VII BC	De Grossi Mazzorin 1989a	229	29.2	39.7	31
Campassini (phase II)	VII BC	Bartoloni <i>et al.</i> 1997	250	13.6	49.6	36.8
Roma - Palatino	VII BC	De Grossi Mazzorin 1989a	23	13	30.4	56.5
Ficana - zona 5a	VII BC	De Grossi Mazzorin 1989a	366	18.7	50.5	30.6
Ficana - zona 3b-c (II+III)	VIII-VI BC	De Grossi Mazzorin 1989a; 1997	205	48.2	29.2	22.4
Ficana - zona 3b-c (III)	VII-VI BC	De Grossi Mazzorin 1989a; 1997	486	33.1	33.9	32.9
San Giovenale (str. 5)	VII-VI BC	Sorrentino 1981a	26	18.7	40.6	40.6
Acquarossa (zona A)	VII-VI BC	Gejvall 1982	374	82.7	12.9	4.3
Acquarossa (trincee)	VII-VI BC	Tagliacozzo 1994	167	52.7	26.3	20.9
Roselle - scavo Donati	VI BC	Corridi 1989	140	30	28.5	41.4
Roselle - scavo Cyegelmann	VI BC	Corridi 1989	54	35.1	20.3	44.4
Cerveteri	VI-V BC	Clark 1989	472	37	34.3	28.6
Montecatino	V BC	Ciampoltrini <i>et al.</i> 1991	262	32.4	37	30.5
Populonia	III BC	De Grossi Mazzorin 1985b	1988	10.3	43	46.7

Tab. 4. Percentages of the three principal domestic animals (cattle, sheep or goat, pig) in the Iron Age settlements of Central Italy along the Tirrenic coast. (M=middle; R=recent; F= final; B=Bronze Age; NISP=number of identified specimens).

Table 5

settlement	date	bibliography	sample size (NISP)	% cattle	% sheep/goat	% pig
Ostia "Castrum"	III-I BC	IPU 1968; 1973; 1977		11,5	1,9	86,5
Ostia "T. Nuotatore"	I - early II AD	IPU 1968; 1973; 1977		12,8	31,8	55,4
Ostia "T. Nuotatore"	second half II AD	IPU 1968; 1973; 1977		3,7	46,3	50
Ostia "T. Nuotatore"	late II-middle III AD	IPU 1968; 1973; 1977		7,8	32	60,2
Ostia "T. Nuotatore"	late III - V AD	IPU 1968; 1973; 1977		12,2	20,4	67,3
Settefinestre	I BC - I AD	King <i>et al.</i> 1985	175	10.8	42.3	46.8
Settefinestre	II AD	King <i>et al.</i> 1985	1520	13	17.3	69.7
Settefinestre	II - III AD	King <i>et al.</i> 1985	710	6	15.4	78.5
Villa dei Quintili	I-II AD	De Grossi Mazzorin 1987	132	-	13.6	86.4

T□.

Table 6

settlement	date	bibliography	sample size (NISP)	% cattle	% sheep/goat	% pig
<i>Aqua Marcia</i> (per. III)	I BC - I AD	De Grossi Mazzorin 1996	152	28.2	5.2	66.4
Foro Transitorio	I AD	De Grossi Mazzorin 1989b	72	12.5	9.7	77.7
Arco di Costantino	I AD	De Grossi Mazzorin, Minniti in study	49	12.2	10.2	77.5
<i>Meta Sudans</i> (US 3399)	I AD	De Grossi Mazzorin, Minniti 1995	382	6.5	18.9	74.6
Quirinale	I AD	De Grossi Mazzorin 1998b	1201	4	15.5	80.5
<i>Caput Africae</i>	I AD	Tagliacozzo 1993	40	5	10	85
<i>Aqua Marcia</i> (per. IV)	I - II AD	De Grossi Mazzorin 1996	139	7.9	14.4	77.7
Arco di Costantino	II AD	De Grossi Mazzorin, Minniti in study	265	6	20.3	73.6
Caput Africae	II AD	Tagliacozzo 1993	163	0.6	25.7	73.6
<i>Aqua Marcia</i> (per. V)	II - III AD	De Grossi Mazzorin 1996	79	-	25.3	74.7
Anfiteatro Flavio (amb. XVIII)	III AD	Minniti in study	206	1,9	6,8	91,3
<i>Schola Praeconum</i>	V AD	Barker 1982		9,6	36,7	53,7
<i>Meta Sudans</i> (US 3641)	V-VI AD	De Grossi Mazzorin 1995c	1852	18,8	26,3	54,8
<i>Meta Sudans</i> (US 3180)	V-VI AD	De Grossi Mazzorin 1995c	42	26,2	23,8	50
<i>Crypta Balbi</i>	VII AD	De Grossi Mazzorin, Minniti 2001	3259	7,3	35,5	57,2
<i>Crypta Balbi</i>	VIII AD	De Grossi Mazzorin, Minniti 2001	3267	10,6	33,7	55,7
<i>Crypta Balbi</i>	IX AD	De Grossi Mazzorin, Minniti 2001	3955	21	28,8	50,2
<i>Crypta Balbi</i>	X AD	De Grossi Mazzorin, Minniti 2001	2448	20,4	32,3	47,3
Argileto	VIII-XI AD	De Grossi Mazzorin	243	10,7	29,2	60,1
S. Cecilia	XIII	De Grossi Mazzorin, Minniti in press	2833	12,3	58,5	29,2
Foro di Cesare	XII-XIV AD	De Grossi Mazzorin 1989b	57	3,5	80,7	19,3

Tab. 6. Percentages of the three principal domestic animals (cattle, sheep or goat, pig) in some urban contexts in Rome.