



The medieval diet in Genova (N.-W. Italy) through the analysis of faunal remains from archaeological sites

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Introduction

The analysis of the faunal remains deriving from archaeological excavations in the urban centre of Genova (N – W Italy) provides a significant contribution to the study of medieval eating habits in the city and, more in general, to the economical history of the relationships between the city (urban sites) and the territory (extra-urban sites) in the Ligurian region. As a matter of fact, archaeozoological studies make it possible to highlight the differences strictly connected with the diet including the consumption of animal food.

Although this field of research is still being analysed, this presentation aims at providing a preliminary synthesis on the status of archaeozoological research in the last 30 years, assessing both already conducted and published studies (Baker & Clark 1993; Biasotti & Isetti 1981, Cartledge, 1978a, 1978b; Clark 1987) and more recent analyses on still unpublished material (Cesana 2006, Cesana *et al.* 2007).

Only the sites located in the present territory of the city of Genova were considered (Table 1 – Fig.1) were considered. We analysed different contexts, such as a castle settlement (Molassana), a bishop's house (San Silvestro), a cloister (Sant'Agostino) and residences of emerging Genoese families, the Embriaci's (Santa Maria delle Grazie), the Fieschi's and the Doria's, (Palazzo Ducale and via Ginevra). This variety of contexts allows to locate, within the city, areas with different food habits and consumptions belonging to the same period, thus highlighting distinct topographical and socio-economical areas in the same town. Moreover, from the comparison between urban sites and peripheral or extra-urban sites, eating habits change not only according to these factors but also based on the surrounding environment, that is the characteristics of the territory and availability of resources.

Also from a chronological point of view, the period being studied goes from the IX to the XV century, thus allowing both a synchronic and diachronic analysis.

Considering all chosen sites, the total number of finds accounts 10,273 animal bones, 3,503 of which were determinable and 6,770 indeterminate.

Materials and methods

In the archaeozoological studies carried out in the Sant'Agostino, via Ginevra and Castelluzzo di Molassana sites, the data available to determine the relative importance of the species in the economics of these settlements were the following: number of indeterminate bones, number of fragments for each species, indication of the mortality curve for pigs, sheep/goats and cattle. In the San Silvestro case also data concerning meat yield, fusion of the epiphyses, presence of skeletal elements together with some measurements were available.

The analysis of the material from Santa Maria delle Grazie and Palazzo Ducale is based on different quantitative methods, the main of which are: counting of the number of fragments, estimate on the minimum number of individuals (MNI) and meat yield calculation (Baker 1991). Unfortunately, all these methods have considerable limitations whatever the type of searched information and are constantly reviewed and modified from a critical point of view. Bone measurements were carried out according to von den Driesch's criteria (1976), while height at withers was calculated through the coefficients proposed by Teichert (1975) for pigs and sheep/goats and by Matolcsi for cattle (1969).

The distinction between goat and sheep was made according to the criteria published by Payne (1985) for denture (mainly observing the third and fourth deciduous premolar) and the studies by Prummel and Frisch (1986) and Boessenck (1964) for long bones.

In the case of the Santa Maria delle Grazie and Palazzo Ducale finds, the methods applied for determining the age of death include the study of bone epiphyses welding (Silver, 1969), the observation of teeth eruption (Silver, 1969) and teeth wear stage (Grant 1982, for pigs and cattle; Payne 1987, for sheep and goats).

Religious buildings

San Silvestro (Biasotti & Isetti, 1981; Cartledge 1978a, 1978b; Baker & Clark 1993)

The bone finds come from the most ancient garden levels of the archbishop's castle (IX - X cent.) and from the stages in connection with the occupation of the bishop's palace and the use of the kitchen (XII – XV cent.).

As to the first stage, among determined bones (Fig. 2a) the most represented animal group is that of pigs (*Sus domesticus*), present with 39 fragments. The study of the age of death indicates that they were slaughtered around the first year of age. Sheep and goats (*Ovis aries/Capra hircus*) are present with 6 fragments and slaughter age is around the second/fourth year. The finds belonging to equines and fish (*Spaarus auratus* and *Dicentrarchus labrax*) are not numerically significant.

During the second stage (XII – XV cent.) sheep and goats are the numerically prevailing animal group (140 finds referable to adult individuals, two/three years of age, together with young individuals of less than 10 months), followed by pigs (98 remains of animals slaughtered in their first two years of age), cattle (24 fragments belonging to animals of two/three and a half years of age), domestic poultry (32 bones) and hare (*Lepus europaeus*) with 4 finds. We also point out two deer (*Cervus elaphus*) bones and a fish fragment (Fig. 2b).

Sant'Agostino (Biasotti & Isetti, 1981)

The studied finds come from the area excavated in the former vegetable garden of the large cloister complex, dating back to the restructuring activities carried out by the monks in the XIII cent.

The three main domestic species are well represented (Fig. 3); a numerous bird population should be highlighted. Sheep and goats (*Ovis aries/Capra hircus*) are present with 27 fragments, pigs (*Sus domesticus*) with 14 bones and cattle (*Bos taurus*) with 10 remains. From the analysis of bone finds we can assume that, as a general rule, sheep and goats and pigs, unlike cattle, were slaughtered at a young age. The bird population is present with 16 fragments (*Gallus gallus*, *Anser arvensis* and *Alectoris rufa*) and fish with only 3 fragments.

Urban Sites

Via Ginevra (Biasotti & Isetti, 1981)

The domestic remains come from a rubbish dump excavated in the clay layers on the Carignano hill ascribable to the Fieschi settlements, one of the most powerful noble families in Genova between the XIII and the XIV cent.

Sheep and goats (*Ovis aries/Capra hircus*) are very numerous – 31 fragments – and largely represented by young animals, slaughtered around their second year of age (Fig. 4).

On the contrary, the osteological finds relevant to cattle (*Bos taurus*) are present in the number of 29 fragments. The data obtained confirm that they were put down at the end of their working cycle.

Pigs (*Sus domesticus*), 22 fragments, are mainly represented by tibiae, metatarsi and phalanges, in which the lack of ossified epiphyses, together with teeth measurement results, prove that their age was about one year when they died.

Palazzo Ducale (Cesana 2006)

The animal bones come from the 19 layers of urban waste that can be dated back to the XII-XIII century (area A of the Munizioniere floor) (Boato & Varaldo Grottin 1992).

During the archaeological excavation a total of 6,387 osteological animal finds were collected, 1,794 of which determinable and 4,593 indeterminate. This low level of faunal material identifiability is due to high bone fragmentation although, as a whole, it is well preserved (Fig. 5). This material consists of meal remains and, to a lesser extent, horny matter processing residues, thrown in an unbuilt area (presumably a yard) that probably acted as a waste disposal site where, besides bones, also metal wastes coming from the nearby metallurgical shops were dumped.

In terms of number of finds, the most represented species is that of the *Sus domesticus* with 847 fragments. The study of death age indicates the presence of individuals of different ages, but most animals were killed between one and three years of age, together with some immature individuals. Examining the distribution and frequency of pigs skeletal elements, no significant differences can be

noticed, since they are all present in similar percentages. The only measurement taken on the heel bone (*calcaneus*) indicates a height at withers of 68.5 cm. The measurements taken on 20 the ankle bones (*astragalus*) vary from a minimum of 62.4 cm to a maximum of 77.7 cm. A peculiarity worth mentioning emerges from these results: given the considerable difference between minimum and maximum height of the individuals, we could assume the presence of different breeds.

In terms of numerical importance, pigs are followed by sheep and goats (*Ovis aries/Capra hircus*), of which 447 remains were collected (29 belonging to *Ovis aries* and 18 to *Capra hircus*). The minimum number calculated for sheep and goats is 19 individuals, among which it seems worth to consider the certain presence of two newborn animals. The analysis of teeth wear and eruption indicates a higher percentage of animals between 1 and 4 years of age, together with a few younger individuals (under 1 year) and elder specimens (over 4-6 years). Considering skeletal elements distribution and frequency, no particular differences were noticed. Dimensions vary from a minimum of 58 cm to a maximum of 64 cm (Teichert 1975; coefficients calculated on the *astragalii*).

Compared with the other two domestic species, the *Bos taurus* finds collected were numerically less important (96 fragments). The analysis of teeth eruption and wear indicates the presence of individuals of different ages, including adult animals over three years of age, together with sub-adult individuals between one and three and a half years of age.

Among the other determined species we can mention: *Equus caballus/Equus asinus*, *Felis catus* and *Canis familiaris*.

As to the bird population, 203 bird bones mainly belonging to *Gallus gallus L.* (198 fragments) and, to a minimum extent, to other farmyard birds (*Anser arvensis*) were collected. Considering the total number of remains, the bird population is the third most represented animal group after pigs and sheep/goats.

A few bones of wild animals were recovered, such as *Meles meles*, *Lepus europaeus*, and a few micromammal remains (*Mus musculus*, *Mustela sp.*).

Finally, the bones of sea fish were 12 (*Spaurus auratus*).

A small but significant percentage of remains (22% on the total determined horns) indicates the practice of activities carried out after sheep, goat and cattle slaughter with the use of slashes and toothed blades, in order to saw the horn either at the bottom or top, and even longitudinally. It is important to underline that this type of finds is present in a precise stratigraphic portion, including the stratigraphic units that can be dated back to the XII century.

The presence of a single deer antler drop with signs of processing seems to indicate some activity connected with handmade production. For this period, the decline in the use of the antler should be highlighted, compensated by an increase in the use of bony and especially horny matter (Mac Gregor 1989).

Santa Maria delle Grazie (Cesana *et al.* 2007)

The faunal samples of Santa Maria delle Grazie are still at the study stage (Fig. 6). The finds found in the inside of the tower, attributed to the powerful family Embriaci, were considered, belonging to the period when the structure was used as a dump (Melli *et al.* 2004; Melli in press). It is a very interesting stratified tip, that had been used for a limited period of time (approx. XII – XIII cent.). As with Palazzo Ducale, the sites need to be located in a period of time (between the XII – XIII – and the beginning of the XIV cent.) in which the city of Genova had started to expand and feel the pressing problem of waste disposal. As demonstrated by the luxurious table vessels of the context, imported from many Mediterranean sites (Melli & Benente in press), the waste was directly connected with the daily life and, consequently, with the eating habits of the family.

In total, the determined remains are 1,287 out of 2,424 fragments. Among domestic animals, the most represented group is that of pigs (*Sus domesticus*) with 205 fragments. These are followed by sheep and goats (*Ovis aries/Capra hircus*) with 126 fragments and cattle (44 finds). The study of the age at death indicates, for pigs, the presence of individuals of different ages, some immature, other sub-adult, many adult (one and two years of age) and some senile individuals.

As to sheep and goats, most remains belong to animals between 4 and 8 years of age – adults – but there are also some young individuals. Osteometric analyses indicate a height at withers between 54.9 cm and 75.2 cm (calculated on the *astragalii*). Also in the case of pigs there are great differences, with height ranging from 66.4 to 68 cm (calculated on the ankle bones).

The study of epiphyses welding for cattle (*Bos taurus*) indicates the presence of young individuals under 12 months destined to meat consumption, and other more adult animals over 3-4 years of age exploited for productive activities as workforce. As to the presence of skeletal elements, for cattle there are mainly *scapulae*, *humerii*, pelvis and femur fragments, together with fore and hind legs. As for sheep and goats there is a prevalence of remains belonging to the fore and hind leg portion (*scapula-humerus-radius-ulna* and *pelvis-femur-tibia*). On the contrary, for pigs all skeletal elements were found with no relevant differences.

A considerable presence of birds should be underlined, with 359 fragments mainly belonging to *Gallus gallus* (335) and, to a lesser extent, to other wild birds (Guinea fowl, *Anser anser*, *Anas sp.*, *Pica pica*, *Corvus sp.*, *Colomba sp.*, *Sturnus vulgaris*).

Considering the total number of remains, the bird population (27 %) is the second most represented animal group after felines (*Felis catus* 419 finds, 33%).

Other animals present in the fauna sample are: *Lepus europaeus*, *Oryctolagus cuniculus*, *Erinaceus europaeus*, *Mus musculus*.

Finally, the presence of 49 fragments of *Testudo hermanni* shell is worth mentioning.

Castle

Castelluzzo di Molassana (Biasotti & Isetti, 1981).

The site is located in a peripheral area compared with the Genova city centre. Archaeological data identify in the second quarter of the XV century a significant military activity and the restructuring of its walls. The constant presence of people inside is largely demonstrated by the pottery and meal remains and the abundant presence of dart and quarrel points proves that military activities within the castle continued in this period as well (Bazzurro et al. 1974).

All faunal material dates back from this last stage of use of the castle (Fig. 7).

As to determined remains, the most represented species is that of pigs with 100 fragments ascribable to animals not over two years of age. The most frequent skeletal elements are *maxillae*, *mandibulae*, loss teeth, *scapulae*, heel bones, metacarpals and metatarsals.

As to sheep and goats (*Ovis aries/Capra hircus*, 75 fragments), slaughter age changes and there are both young and adult animals. The most frequent skeletal elements are heel bones, phalanges and long bones.

Cattle (*Bos taurus*), 13 remains, are even less than the birds (32 fragments), and are represented by finds with welded epiphyses, indicating slaughter at an adult age.

Discussion

Archaeological analysis allowed to highlight a diversified picture of the Genoese situation in the Middle Ages, not only in terms of the eating habits connected with meat consumption but also, more in general, giving a contribution to the economics linked with this type of market exchanges.

Generally speaking, the chosen sites were classified according to the context into three types: religious buildings, urban sites and castle.

Within the first group we have the examples of San Silvestro and Sant'Agostino (Fig. 2a, 2b, 3). As already described, these are numerically limited faunal samples, however they allow us to outline some common features and differences. First of all, they were both the subject of a great fragmentation process, particularly evident in San Silvestro where over 88% of remains are indeterminable. During the early medieval phase in this site almost all finds (39) belong to pigs, while only 6 remains can be ascribed to sheep and goats. On the contrary, in Sant'Agostino – that can be dated back to the late Middle Ages – 27 sheep and goat remains and 14 pigs bones were determined. Although this predominance is not as clear as in San Silvestro, we can notice an opposite situation where the sample seems to reflect a different situation, given the presence – although of a secondary type – of cattle, birds and fishes.

In both sites the study of the age at death indicates a diversified exploitation of animals: pigs, slaughtered at a young age (one) are destined for meat consumption; sheep and goats were killed between two and four years of age, because they are also used for by-products such as milk, cheese and wool. On the contrary, cattle, were put down at the end of their working cycle.

We can assume that faunal remains reflect two situations of food habits and consumption that were different not only in terms of dating (as a matter of fact, San Silvestro can be dated back to the IX-X century, while Sant'Agostino to the XIII century) but also in terms of context: rich eating habits on the archbishop's table and a humble diet based on monastic rules in the cloister.

Within the so called "urban" sites, located in gentleman's residences, we can include the materials coming from via Ginevra, Palazzo Ducale and Santa Maria delle Grazie (Figg. 4-5-6).

As to frequency of domestic species, Palazzo Ducale and Santa Maria delle Grazie have similar characteristics. To this information we can add the data on meat yield, allowing us to get some information concerning the importance of each of the three species in eating habits (Barker 1981). In Palazzo Ducale pork accounts for a percentage of 45%, while in Santa Maria delle Grazie the most represented type of meat is beef (49%). If we analyse the frequency of skeletal elements and the results on death age, the two sites seem to be very similar. Exploitation is diversified: both pigs and sheep/goats were slaughtered at a suitable age for optimum meat yield. Pigs are the only animal group raised exclusively for eating purposes, while the other animals could be used to obtain various

products or workforce. For instance, some of the older sheep and goats (over 3 years of age) were maybe bred to use their milk and wool. On the contrary, for cattle some adult individuals were found that were presumably used for milk production or work before being slaughtered. The younger ones (suckling calves, individuals of less than two years of age) were raised for meat. The presence of both young and adult individuals is a substantially normal fact in a mixed economy aimed at meat production and at the exploitation of by-products and workforce. Since we have not found a faunal sampling particularly present with specific carcass parts, it can be assumed that all three domestic species were slaughtered and/or raised on site. Some animals could also be taken from somewhere else and brought to the site alive before being killed.

The results of the analyses of the Via Ginevra materials are different, because here sheep and goats prevail (31 fragments). Going to analyse the differences between Palazzo Ducale and Santa Maria delle Grazie, we should underline that in the former site, to vary the diet, there is a minimum food consumption represented by domestic birds and fish, while in the latter case more domestic and wild birds were found. As to wild birds, a significant finding should be underlined: two skulls of Guinea fowl (USS 2040-20411) indicating some contact with the Mediterranean world. In fact, it is well-known that the Romans introduced this bird in Europe and Africa and that it is present in late medieval banquets (U. Albarella 2007, personal communication). To this we have to add another eating peculiarity, that is the finding of fragments of land turtle shell (*Testudo hermanni*), which should make us assume its consumption in gentlemanly contexts. A large amount of land turtles was discovered, in Italy, in the Convent of Trinità dei Monti in Rome (XVI-XVIII cent.), where they were used in alternative to fishes (De Grossi Mazzorin & Minniti 2000).

Therefore archaeozoological analysis seems to indicate a high quality diet adequate to the customs of the emerging Genoese families (the abundant presence of very young pigs and sheep and goats is significant).

As to the Castelluzzo di Molassana (Fig.7), we can notice a faunal composition similar to urban sites, with a prevalence of pigs fragments, followed by sheep/goats and a few cattle bones, with the addition of considerable bird consumption. In particular, where there is the proven presence of a military garrison, there is often an increase in pigs remains, whose meat was considered the most suitable source of nourishment for those involved in war activities (Clark 1987).

The comparison between the urban sites connected with a gentlemanly context and those linked with religious building is certainly much more interesting.

In this case, examining the main domestic species, the San Silvestro area has got a faunal composition similar to that of Palazzo Ducale and Santa Maria delle Grazie. These are three refined contexts, connected with noble families and a bishop's seat. We can therefore notice similarities in the collected faunal remains, thus confirming a rich and high quality diet in the urban area. At the same time, within the same city, we can assume the presence of a different eating situation testified by the XIII century levels of a large cloister complex like the one of Sant'Agostino. In this case, based on the number of remains, the sheep and goat species prevails, the sign of an exploitation of these animals not only for meat but also for their dairy products (milk, cheese). To this we should add the presence of birds (usually domestic poultry), which should not be underestimated although the sample proved to be statistically limited.

These data would confirm the hypothesis of different eating habits and consumptions according to the social context reflected by the faunal samples.

In a social environment such as the aristocratic one, behavioural ethics identified voluntary abstention from meat as a sign of weakness and the prohibition to eat it as an extremely serious punishment, a sign of humiliation and marginalisation from the society of the strong.

The eating behaviour model developed by the monastic culture is completely different, since it identified abstention from meat as a distinctive and qualifying point of "sanctity". So in monastic tradition all products such as fish, cheese, eggs and legumes able to replace meat in one way or another started to become very important. Pork was particularly avoided because pigs were considered as impure in the tradition of the Old Testament that, although not representing the direct source of ecclesiastical rules, was however its most authoritative point of reference. People often distinguished between *carnes* and *pulli*, that is between the meat of quadrupeds and birds. As a matter of fact, the ban on meat consumption referred to the former, since birds were not expressly forbidden by no-one (Montanari 1988).

This means that meat consumption, exalted by aristocratic ethics as an instrument and symbol of vitality, strength and power, was excluded by monastic ethics, strictly ascetic and penitential, that tends to identify it as a sign of sin, refusing it or anyway confining it to the level of mere necessity (Montanari 1988).

Finally, the detailed analysis of the osteological animal finds from archaeological excavations can give a contribution in outlining some hypotheses on the sources of meat procurement in medieval Genova.

In the past, animal food arrived to town from three different sources. Most animal proteins came from farms or rural estates that could be far away in terms of space from the urban market they supplied. A small portion of meat, eggs and dairy products was obtained from the cattle raised in or close to the city itself. In this case, although it is common opinion to imagine medieval cities as being very crowded, evidence from archaeological excavations, like the faunal samples studied, indicates the existence of uncultivated land, with gardens, vegetable gardens and orchards within the city limits, also in larger towns. The third source of meat procurement is represented by occasional hunts (wild fauna is almost absent in the studied samples) and likely fishing activities along the coasts or in the inland waters (O'Connor 1989). In urban estates sheep and goats, and especially sheep, could represent a useful resource ensuring milk in modest but constant amounts thanks to a long lactation period.

The animal meal remains from urban excavations can therefore be seen as the product of a complex and interlinked economic system in which different products were obtained from as many different resources (O'Connor 1989).

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Sites	Centuries	Context	References
San Silvestro	IX – X	Religious buildings	Cartledge, 1978a , 1978b Biasotti & Isetti, 1981
Sant'Agostino	XIII		
Via Ginevra	XIII - XIV	Urban sites (abitazione nobile)	Biasotti & Isetti, 1981 Cesana 2006 Cesana <i>et al.</i> 2007 unpublished report
Palazzo Ducale	XII – XIV		
Santa Maria delle Grazie	XII - XIII		
Castelluzzo di Molassana	XV	Castle	Biasotti & Isetti, 1981

Tab. 1: Investigated contexts , Genova (ITALY).

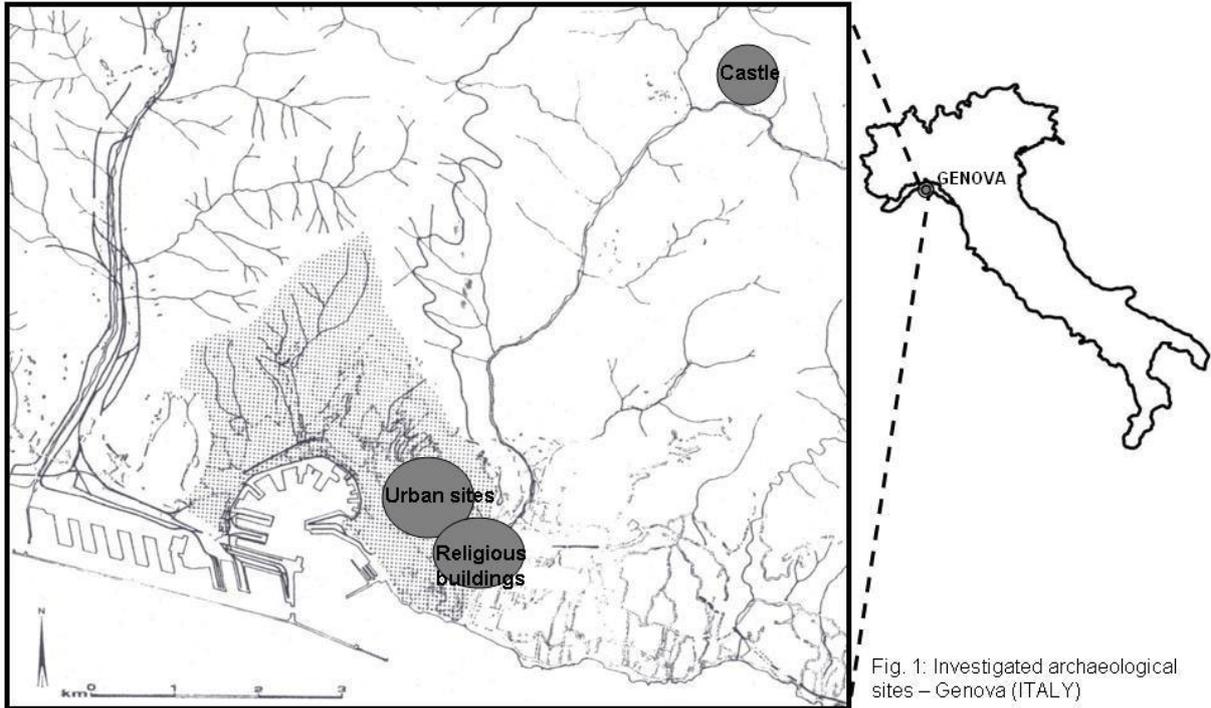


Fig. 1: Investigated archaeological sites – Genova (ITALY)

Fig. 1: Investigated archaeological sites (Gardini & Milanese, Archeologia medievale, VI, 1979, page 137. Modified by D. Cesana).

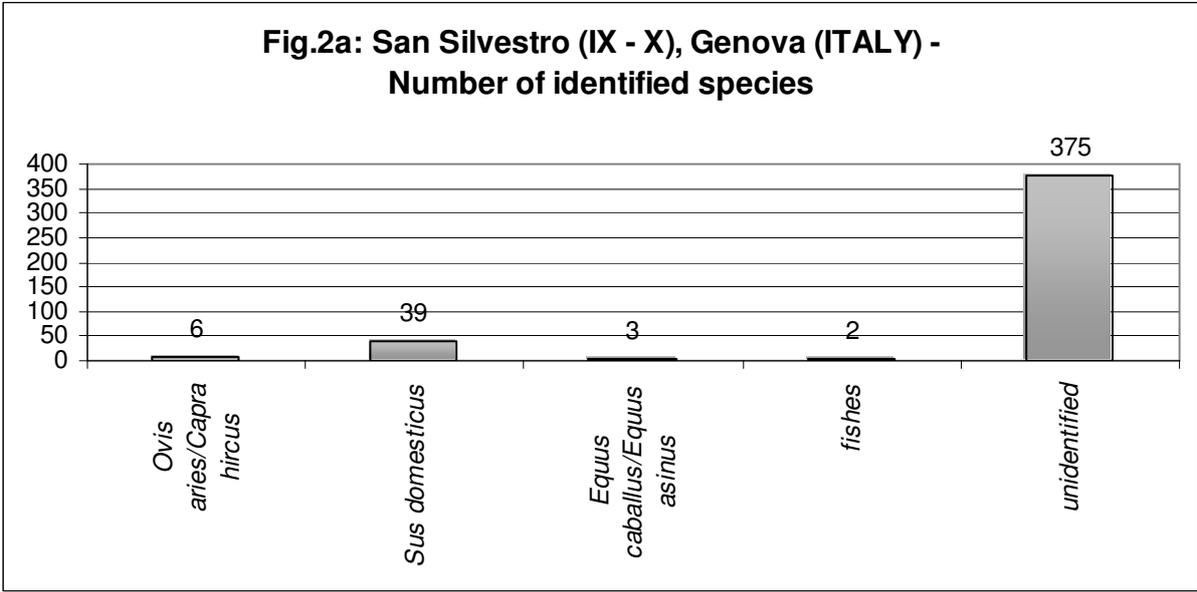


Fig. 2a: San Silvestro (IX – X), Genova (ITALY) – Number of identified species.

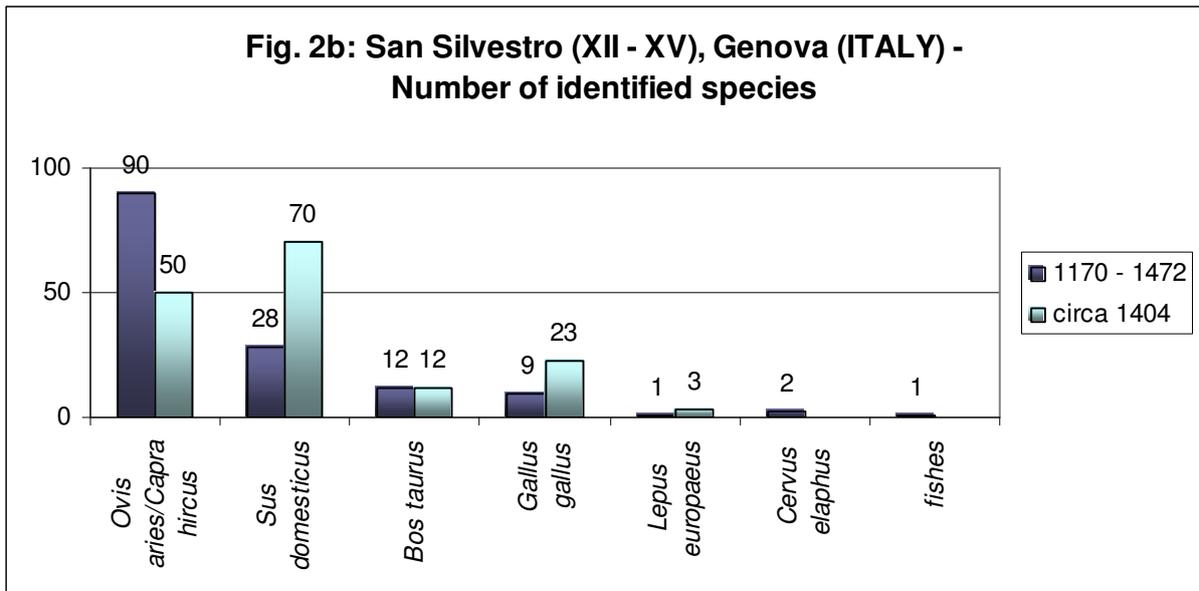


Fig. 2b: San Silvestro (XII – XV), Genova (ITALY) – Number of identified species.

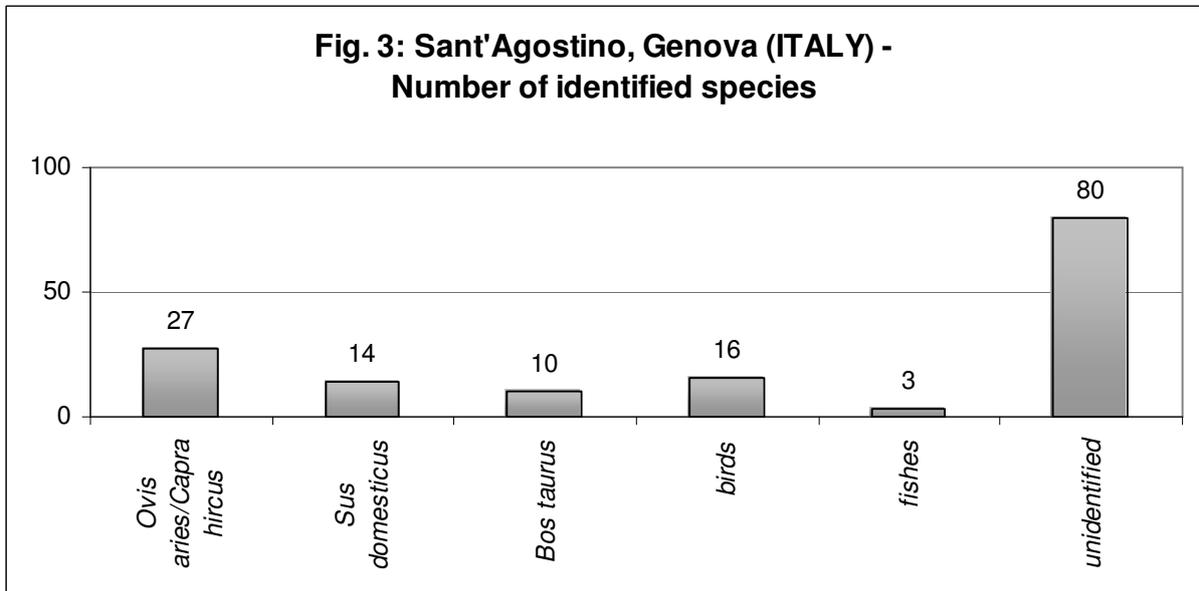


Fig. 3: Sant'Agostino, Genova (ITALY) – Number of identified species.

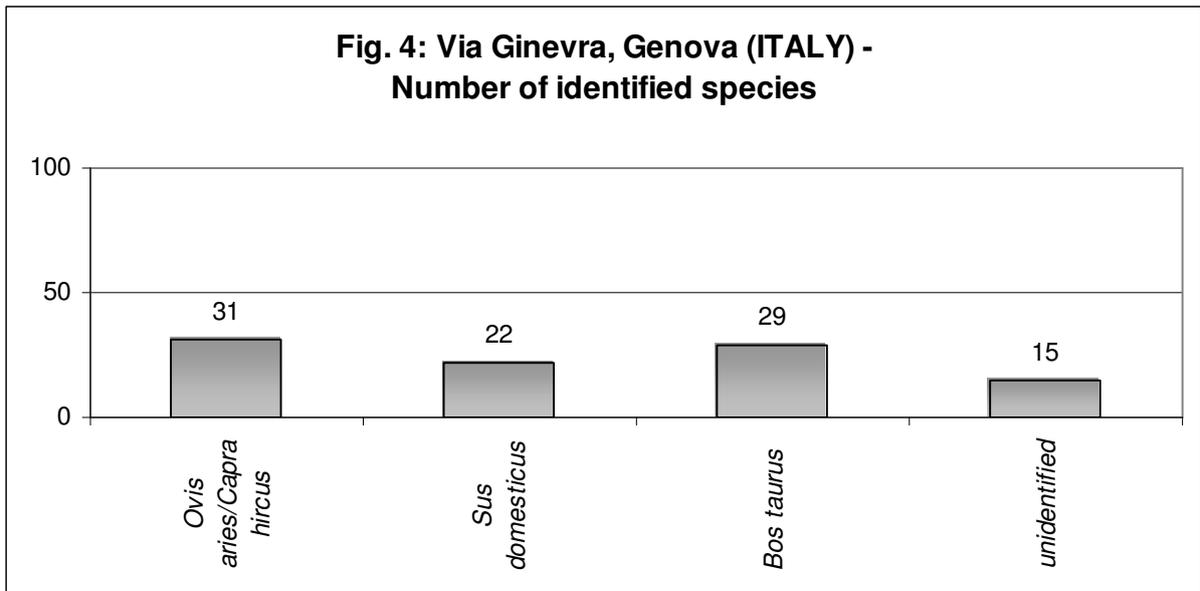


Fig. 4: Via Ginevra, Genova (ITALY) – Number of identified species.

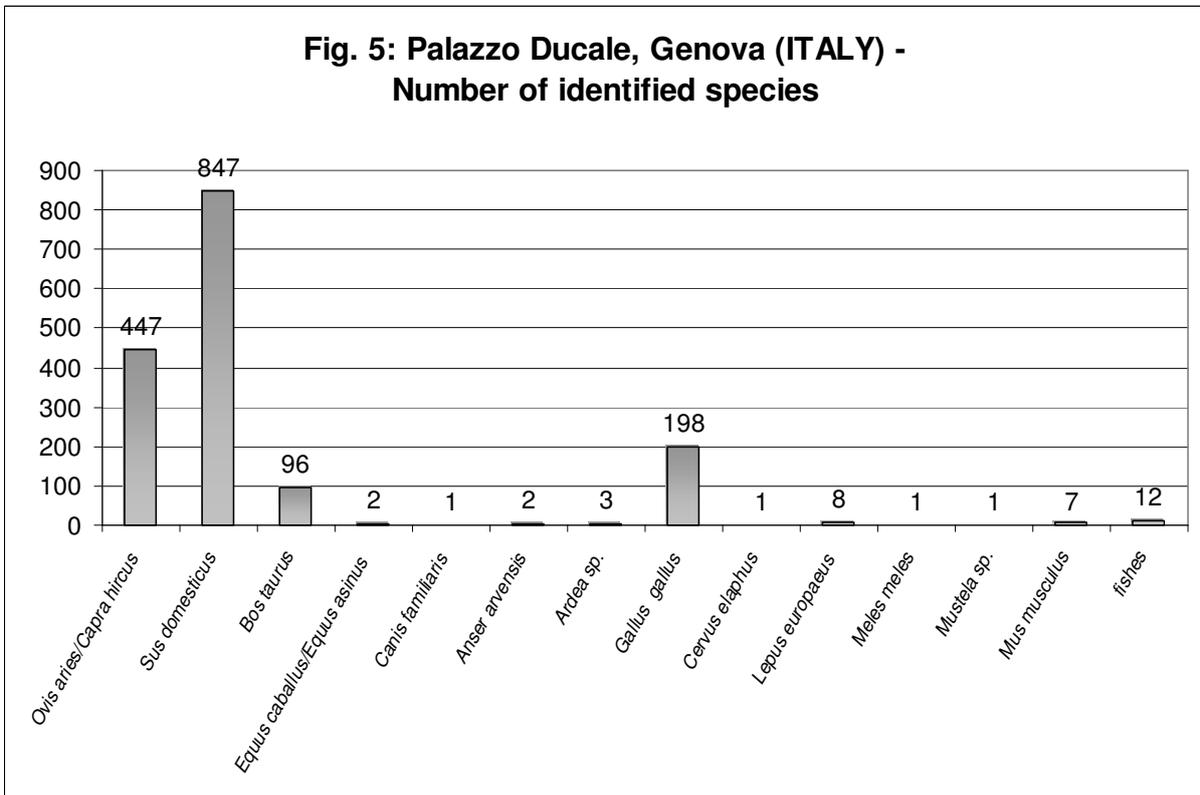


Fig. 5: Palazzo Ducale, Genova (ITALY) – Number of identified species.

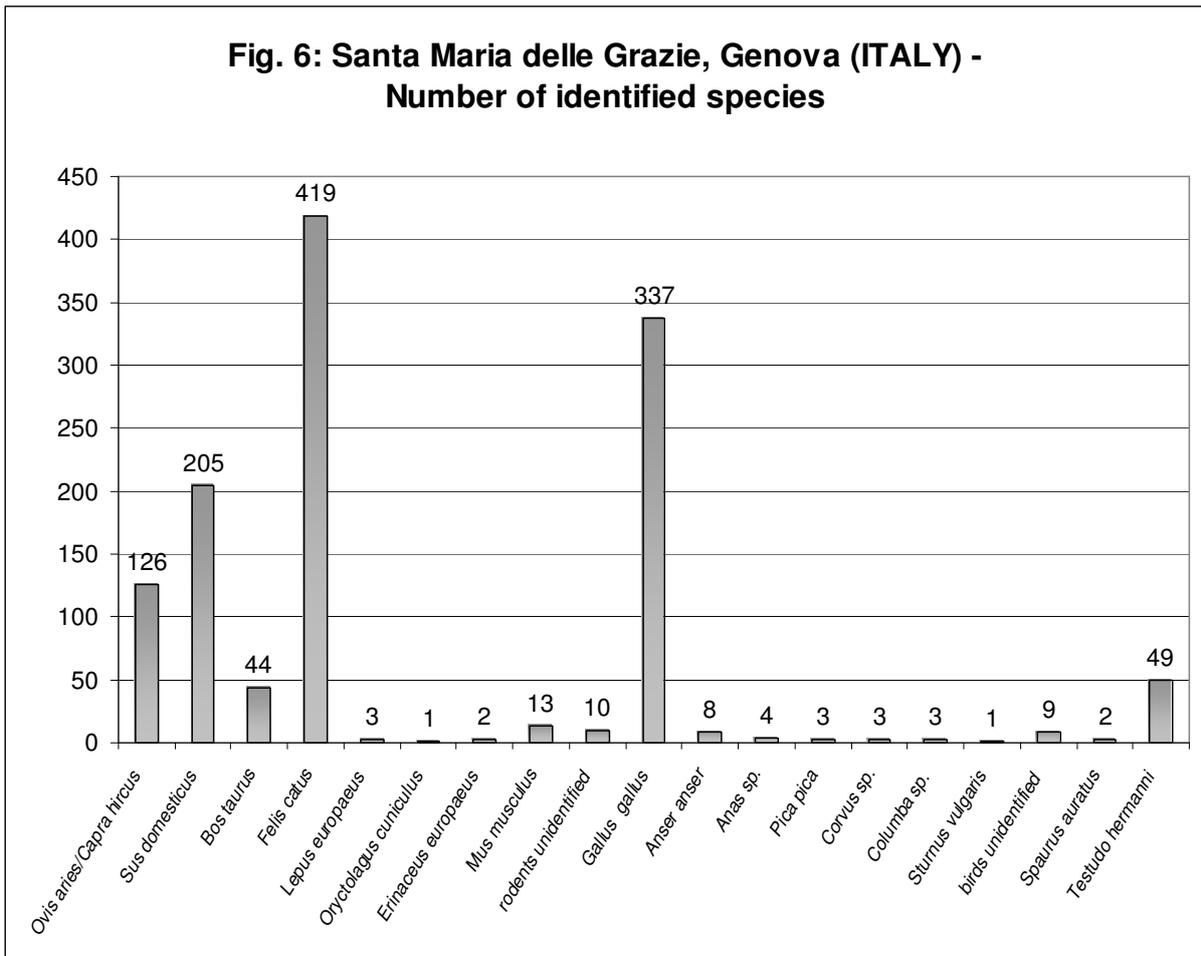


Fig. 6: Santa Maria delle Grazie, Genova (ITALY) – Number of identified species.

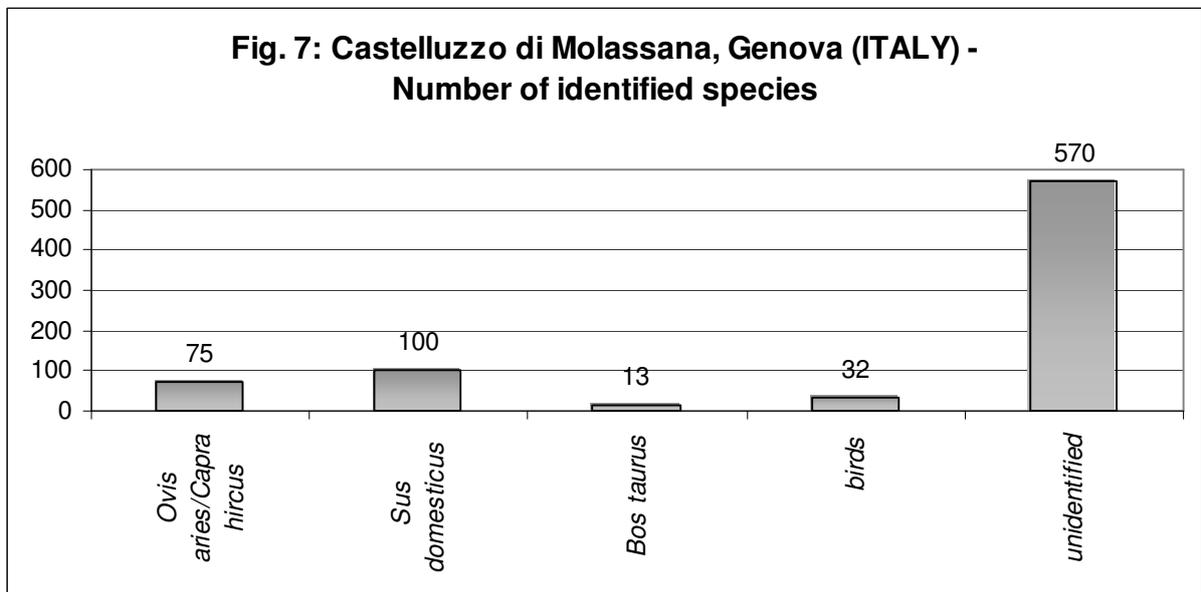


Fig. 7: Castelluzzo di Molassana, Genova (ITALY) – Number of identified species.