

# The mammal fauna of Monticino Quarry

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with the collaboration of

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## FOREWORD

To date, eighteen fossiliferous sites have been found in the Monticino Quarry (Fig. 1). Most of them have been destroyed by quarrying. Their fossil content varies from a few teeth to fairly rich faunas. Some sites have yielded both large and small mammals, while others only one or the other. The sites are labeled BRS (Brisighella), followed by a number.

Individual fissures may have been encountered two or more times in the course of quarrying, though this cannot be demonstrated because data with which to reconstruct the morphologies of the fissures could not be collected. We have therefore chosen to consider each fossiliferous point as a distinct site, though we believe that sites BRS 1, 11, 12, and 13 correspond to the same fissure. Likewise, sites BRS 5 and 20 are probably from a common fissure, as are sites BRS 6 and 16. The tentative faunal list published by Costa *et al.* (1987) has been modified by studies in progress (insectivores: F. Masini, chiropters: T. Kotsakis, carnivores: D. Torre, bovids: Masini & Thomas, rodents: C. De Giuli, lagomorphs: F. Masini). The following is an updated faunal list:

## INSECTIVORA

*Galerix* sp. aff. *depereti*  
*Postpalerinaceus* sp.  
*Episoriculus* aff. *gibberodon*  
Soricidae indet.

## CHIROPTERA

*Megaderma* gr. *vireti-mediterraneum*  
Rinolophidae Sp. A  
Rinolophidae Sp. B  
Vespertilionidae indet.

## PRIMATES

Colobinae cf. *Mesopithecus*

## PROBOSCIDATA

cf. Gomphotheridae

## CARNIVORA

*Plioviverrops* n. sp.  
Hyaenidae indet.  
Canidae indet.

## TUBULIDENTATA

*Orycteropus* sp.

## PERISSODACTYLA

*Dicerorhinus* cf. *megarhinus*  
*Hipparion* sp.

## ARTIODACTYLA

*Samotragus* n. sp.

Bovinae cf. *Parabos*  
Bovidae indet.  
Cervidae indet. (small size)  
Suidae indet.

## RODENTIA

*Hystrix* sp.  
*Stephanomys* n. sp.  
*Paraethomys anomalus*  
*Castillomys* n. sp.  
*Apodemus* cf. *gudrunae*  
*Cricetus* cf. *barrierei*  
*Ruscinomys* cf. *lasallei*  
*Eliomys* sp.  
*Atlantoxerus* cf. *rhodius*

## LAGOMORPHA

*Trischizolagus* cf. *maritzae*  
*Prolagus* n. sp.

Some reptile, bird, and fish remains are also present.

Table 1 shows the occurrence of the taxa in the different sites. BRS3, BRS5, and BRS6 are particularly rich in micromammals, while large mammals are common in sites BRS1 and BRS5.

## TAPHONOMY

Fossils are for the most part concentrated in fissures, though in site BRS4 remains were scattered and embedded in sediments filling a broad superficial karst cavity in direct contact with the overlying sequence. The karst morphology of the fissures is generally evident.

Rodents form the bulk of the Brisighella Fauna. Some families are represented by a single or at most a few specimens. Murids are by far the dominant rodent family, although their diversity is moderate. Only 4 species from 4 separate genera occur. Moreover, two of the species are quite rare.

Small mammal remains are mainly concentrated in extremely rich lenses in the BRS 3, 5, and 6 sites. The high concentration of fossils can be attributed to the accumulation of pellets produced by birds of prey resting in vicinity of the fissures. This conclusion is supported by the observation that there are neither significant differences in the occurrence of left and right molars nor in the number of first and second molars (Table 2).

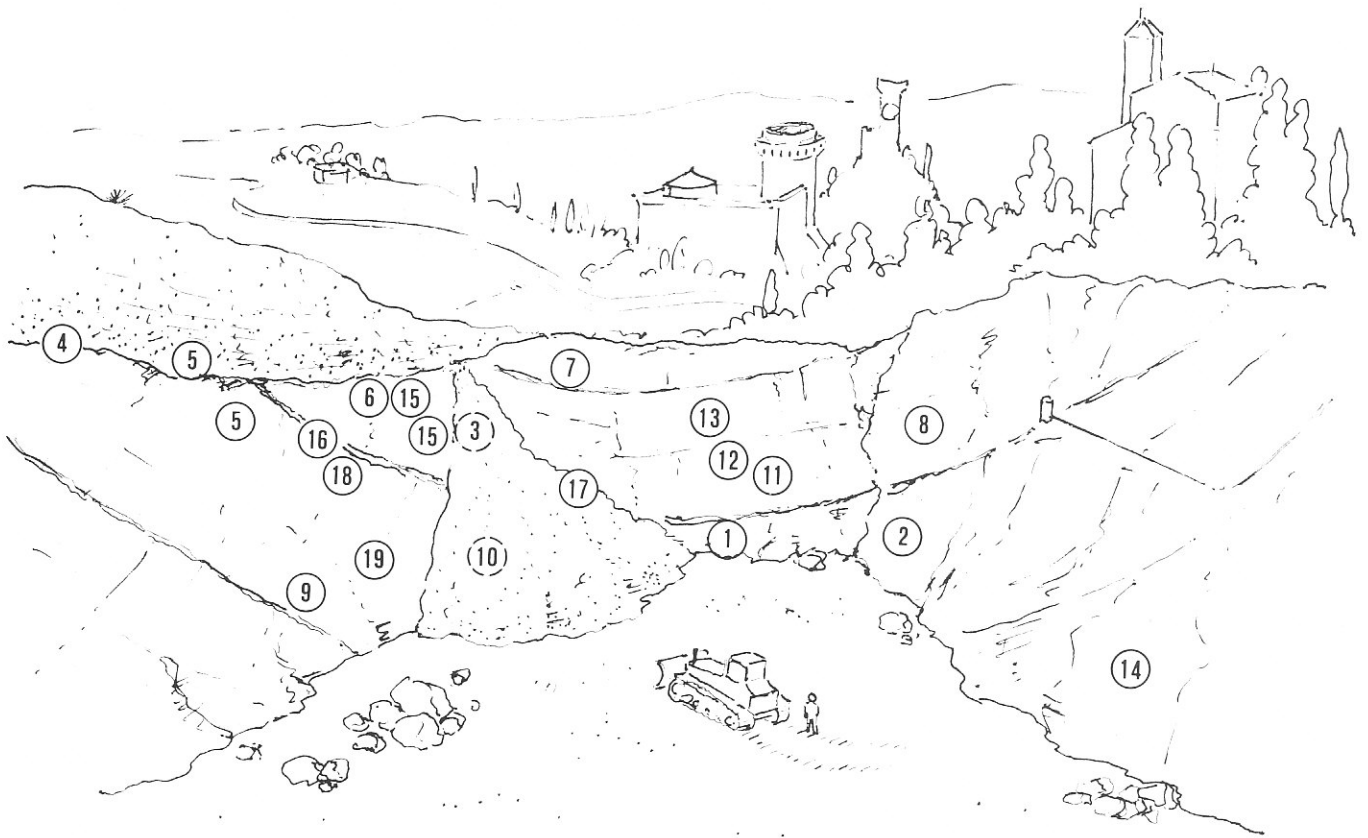


Fig. 1 – Fossiliferous sites in the Monticino Quarry.

Large mammal remains are found either as partially articulated skeletons, or as scattered, transported fragments.

In spite of the large number of fossil finds, the faunal assemblage is poorly representative of the mammal communities of the latest Turolian. Fossils from large or very large macromammals are extremely rare. For example, amongst the herbivores, proboscidians are poorly represented (only 1 find), as are rhinoceroses, hipparions, and large bovines. Carnivores are almost exclusively represented by the small sized «hyaenid» *Plioviverrops*. We think that one of the factors responsible for this selection is the small size of the fissures that have been excavated to date. Since this explanation cannot be used to account for the characteristics of the microfauna, the extreme scarcity of the cricetids and the almost total absence of the glirids seem to be an actual characteristic of the association living in the area.

The occurrence of articulated skeletons, specifically in the BRS5 site, suggest that some of the karst cavities acted as natural traps. This hypothesis is supported by the relative over-representation of carnivore remains.

## TAXONOMY

### Insectivores

*Galerix* sp. aff. *depereti*. *Galerix* is represented by single molars and lower premolars. This moon rat differs from *Galerix socialis* and the Vallesian and Early Turolian representatives of the genus because

of its larger size and somewhat different dental features. The lack of upper P3 and P4 and mandibular remains prevented us from making definite conclusions. However, some similarities to the Pliocene species *G. depereti* may suggest a relationship with this species.

*Postpalerinaceus* sp. The hedgehog is known in the Monticino fauna only from very few, scant dental remains.

*Episoriculus* aff. *gibberodon*. This shrew is the most widespread insectivore in the Monticino sites. It is somewhat smaller than the Pliocene *E. gibberodon*.

Soricidae indet. Two fragments of mandible of a very small shrew were recovered in site BRS20. The lower molars are not pigmented and mesio-distally compressed, as in the Miosoricinae.

### Chiropters

Bats are only represented by a few teeth that have not yet been studied. The presence of a Megadermatide belonging to *Megaderma* gr. *vireti-mediterraneus*, documented by a fragment of a lower M1 and a canine, is worth mentioning.

### Primates

Colobinae cf. *Mesopithecus*. A single upper canine that displays the typical morphology of a fairly large Colobinae may be attributed to *Mesopithecus*.

## Proboscidians

Cf. Gomphotheridae. A single rolled fragment of a tooth from site BRS19 can be attributed to a bunodont proboscidian.

## Carnivores

Only three species are present amongst the fossils collected: a canid represented only by a premolar, a medium sized hyaenid, documented by a tooth fragment, and a new form of *Plioviverrops*, which is represented by many fossils. Judging from the characteristics of its teeth, *Plioviverrops* must have preyed on small vertebrates, although, like the larger hyaenid, it must have also eaten carrion. The high concentrations of *Plioviverrops* remains may be due to the existence of natural traps into which the animals fell, lured by the presence of carrions.

Canidae indet. It is a fox sized species possibly referable to the canid of Venta del Moro (Spain).

Hyaenidae indet. This fossil has been identified from a fragmentary lower M2 collected at site BRS3.

Table 1 - Distribution of taxa in the sites of the Monticino quarry.

	BRS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	19	20
<i>Galerix</i> sp. aff. <i>depereti</i>	-	?	X	-	X	X	-	-	-	-	-	-	X	-	X	-	-	-	X
<i>Postpalaerinae</i> sp.	-	-	-	-	X	-	-	-	X	-	-	-	-	-	-	-	-	-	-
<i>Episorculus</i> aff. <i>gibberodon</i>	-	X	X	X	X	X	-	X	X	-	X	X	-	-	-	-	-	-	X
Soricidae indet. (small size)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X
<i>Megaderma</i> gr. <i>vireti-mediterraneum</i>	-	-	X	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rinolophidae indet.	-	X	-	-	X	X	-	-	-	-	-	-	-	-	-	-	-	-	X
Vespertilionidae indet.	-	-	X	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chiroptera indet.	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-
Colobinae cf. <i>Mesopithecus</i>	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
cf. Gomphoteriidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X
<i>Plioviverrops</i> n.sp.	-	X	X	X	X	-	-	-	-	X	-	-	-	-	-	-	X	X	-
Hyaenidae indet.	-	-	X	-	?	-	-	-	-	-	-	-	-	-	-	-	-	-	?
Canidae indet.	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Orycteropus</i> sp.	-	-	-	?	X	-	-	-	-	-	-	-	-	-	-	-	-	-	?
<i>Dicerorhinus</i> cf. <i>megarhinus</i>	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Hipparion</i> sp.	X	-	X	-	X	-	-	-	X	-	-	-	-	-	X	-	-	-	-
<i>Samotragus</i> n.sp.	X	X	-	?	X	?	-	X	X	X	-	-	-	-	X	X	X	?	-
Bovinae cf. <i>Parabos</i>	X	-	-	-	X	-	-	-	-	-	-	-	-	-	-	X	X	-	-
Bovidae indet.	-	-	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cervidae indet. (small size)	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Suidae indet.	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Hystrix</i> sp.	-	-	-	-	X	?	-	-	-	-	-	X	-	-	-	-	-	-	-
<i>Stephanomys</i> n.sp.	X	X	X	X	X	X	X	X	X	-	X	X	-	X	X	X	-	X	X
<i>Paraethomys anomalus</i>	X	X	X	-	X	X	-	-	X	-	X	X	-	-	-	X	-	X	X
<i>Castillomys</i> n.sp.	X	X	-	X	X	X	-	X	X	-	X	X	-	-	-	-	-	-	X
<i>Apodemus</i> cf. <i>gudrunae</i>	-	-	X	X	X	X	X	?	-	-	-	-	-	-	-	-	-	-	X
<i>Cricetus</i> cf. <i>barrierei</i>	-	-	X	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Ruscinomys</i> cf. <i>lasallei</i>	-	-	-	X	X	-	-	X	-	-	-	-	-	-	-	-	-	-	-
<i>Eliomys</i> sp.	-	-	-	-	-	?	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Atlantoxerus</i> cf. <i>rhodius</i>	-	-	X	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Trischizolagus</i> cf. <i>maritzae</i>	-	X	-	X	X	X	-	X	X	-	-	-	-	-	X	-	X	X	X
<i>Prolagus</i> n.sp.	X	-	X	X	X	X	-	X	X	-	-	-	-	X	-	-	-	-	X

Its features do not allow a precise determination to be made, but its size suggests a possible *Thalassictis* form.

*Plioviverrops* n. sp. Is mainly present in the BRS5 site, where some articulated skeletons were found. This fox-sized carnivore represents the most evolved species of the *Plioviverrops* line. Its molars display better developed pricking characteristics than do any other species of the genus.

## Tubulidentata

*Orycteropus* sp. This peculiar ant-eater has been identified on the basis of the very typical features of a single molar from site BRS5. It is also represented by some limb bones that suggest the presence of part of an articulated skeleton. Fossil *Orycteropus* are very uncommon in Eurasia, and in Europe are only known from Samos and Perpignan (Lavocat, 1958).

## Perissodactyls

Although this order is generally well represented in Late Miocene sites, at Brisighella there are only rare

and isolated remains.

*Dicerorhinus cf. megarhinus*. Large rhinoceros remains probably derived from a single individual were collected from site BRS1.

*Hipparion* sp. This genus is only represented by some teeth and incomplete post cranial elements.

## Arctiodactyls

The bovids are the best represented artiodactyls. However, as is the case in other European localities of equivalent age, the bovids from Brisighella are much less differentiated than those from Late Turolian faunas of the Balkanic peninsula and Asia Minor. The extreme fragmentation and the low number of significant specimens has in some cases reduced the possibility of specific determinations.

*Samotragus* n. sp. This small Oiocerini is documented by a great deal of material. Most of the remains referred to this species have been collected in site BRS5 and part of them probably belong to articulated skeletons. The morphology of an incomplete frontal with horn cores, its teeth, and its overall body size prove that this species differs with respect to the large *Samotragus crassicornis* from Samos and the older, smaller *S. praecursor* from the Ravine de la Pluie (Late Vallesian, Macedonia). It is, at present, the western-most find of this genus in Europe.

Bovinae cf. *Parabos*. The presence of a Bovinae is proven by the scant remains of a very large antelope. The morphology of a single lower molar suggests a possible relationship with *Parabos* s. l., a genus that is common in Spain in levels of equivalent age (Moyá Solá, 1983).

Bovidae indet. A number of post cranial remains and an upper third molar indicate that a bovid larger than *Samotragus* was present.

Cervidae indet. Only an upper molar for its brachyodont crown may be referred to a small species of this family.

Suidae indet. Two tarsal bones document the occurrence of a suid.

## Murids

The taxonomy of the murids has not yet been fully established, and it is difficult to insert new specimens into phylogenetic lineages that are valid over geographically limited areas. Because the fauna we are dealing with does not compare with any other Italian fauna, with the possible exception of the scant Baccinello V3 fauna, taxonomic terms will be used in a purely descriptive sense.

*Stephanomys* is represented by a new species different from and more evolved than *Stephanomys ramblensis* of Valdecebro 3, though still not as apomorphic as *Stephanomys donnezani*. It is the most abundant species in all the sites, and is very similar to the few published specimens of Caravaca.

*Paraethomys*. The specimens from the BRS sites do not differ significantly from *Paraethomys anomalous*. This taxon is the second most common species in Brisighella, and indicates that there was a strong faunal connection with the site of Maritza described by De Bruijn *et al.*, 1970.

*Castillomys*. Though this genus is never abundant, it occurs in almost all sites. Surprisingly, it is absent from the richest site (BRS3). The specimens from Brisighella have peculiar characteristics that point to the Pleistocene genus *Orientalomys*. A new subgenus will be created to house this species.

*Apodemus*. The specimens which can be referred to this genus are very rare, but widespread in many sites. The scantiness of the material does not allow precise determinations to be made. At present the specimens can be attributed to *Apodemus cf. gudrunae* though there are probably some apomorphies in respect to the typical form described by Van de Weerd, 1976.

## Cricetids

*Cricetus* occurs in BRS3 (one broken specimen) and in BRS6 (five specimens). On the basis of its size and morphology it can be referred to *Cricetus cf. barrieri*.

*Ruscinomys* occurs in BRS6 (eight specimens) and as single worn specimens in BRS4 and BRS9. Its hypsodonty and size suggest that it can be referred to *Ruscinomys cf. lasallei*.

## Sciurids

*Atlantoxerus*. This genus is present in BRS6 (two specimens) and BRS3 (one specimen). Because of the patterns of its teeth it is referred to *Atlantoxerus cf. rhodius*.

## Glirids

*Eliomys*. It occurs only in BRS6, and cannot be referred to any particular species.

## Histricids.

*Hystrix* occurs in BRS5 and BRS12. The presence of this genus, which cannot be better determined, is indicated by a few teeth, a femur, and a humerus fragment.

Table 2 - Occurrence of *Stephanomys* and *Paraethomys* teeth in BRS3, BRS5, and BRS6.

		Stephanomys			Paraethomys		
		BRS3	BRS5	BRS6	BRS3	BRS5	BRS6
M1/	r	149	37	9	57	10	1
	l	137	30	12	72	4	2
M2/	r	140	42	8	46	10	3
	l	149	22	12	49	12	2
M/1	r	115	29	7	57	16	1
	l	115	29	8	55	12	4
M/2	r	149	33	4	57	17	2
	l	148	34	10	60	18	-

## Lagomorphs

*Trischizolagus* cf. *maritzae*. This leporid, which is the most widespread and abundant lagomorph, is represented by teeth and limb bones whose morphologies are like those of the species from Maritza.

*Prolagus* n. sp. This ochotonid is represented mainly by teeth and is rather uncommon in the BRS sites. The recent discovery of a complete skeleton from a marly interbed in the Messinian Gessoso-solfifera Fm. near Pesaro (Italy), has allowed us to recognize a new species which has an overall similarity with *P. michauxi*, though some cranial and dental features are different. The remains from Brisighella can be referred to this new species on the basis of their dental morphologies.

## CONCLUSIONS

The rodents indicate that the BRS fauna belongs to the MN13 zone. The evolutionary level reached by some species may better define the biochronological setting. For instance, the close relationships between the BRS *Paraethomys* and *P. anomalous* from Maritza supports the hypothesis that BRS is a late MN13 fauna.

It is difficult to interpret the significance of the presence of new species of micro and macromammals, because the associations of the MN13 zone are poorly defined, especially in the case of the macromammals. Even though these species cannot be used to improve the biochronological resolution, their presence does not conflict with the assignment of BRS to zone MN13. In fact, their characteristics are more derived than those of cogeneric species from zone MN12.

Furthermore, probably we face a new biogeographical province. Some species suggest there were close connections with oriental faunas. For example, *Ploviverrops* n. sp., is phylogenetically linked to *P. orbigny*, from Greece, and *Samotragus* n. sp., is the western most representative of this genus that has been found in the Mediterranean Area. On the other hand, the *Stephanomys* from Brisighella is the eastern-most representative of this genus.

Data on Italian faunas of similar ages are not abundant. The best known is the Baccinello V3 (Grosseto) fauna (Huerzeler & Engesser, 1976; Engesser, in preparation), and the Gravitelli Fauna from Sicily. The Gravitelli fauna was destroyed by the earthquake that struck Messina in 1908, and is therefore known only from descriptions in the literature (Seguenza, 1902, 1907). Few of its elements appear to be comparable to either those from Brisighella or from Baccinello V3.

The Brisighella fauna differs considerably from the Baccinello V3 fauna, in which suids, cervids, and hipparions are widely represented and the carnivores are more diversified. *Stephanomys*, which is apparently replaced by *Rhagapodemus*, does not occur among the rodents from Baccinello. As a matter of fact, there are too few common faunal elements to permit detailed correlations based on systematics.

One factor contributing to the variations in the faunas was certainly the differences in the taphonomic conditions in the three areas, and therefore the exi-

stence of three fairly different biotypes seems reasonable.

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For other references cited see Vai (this vol.).