

LATE VILLAGRANCHIAN MAMMALS FROM A KARST FISSURE AT ALONTE (BERICI HILLS, VICENZA, NORTHERN ITALY)*

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RIASSUNTO - *Mammiferi tardo-villafranchiani provenienti da una fessura carsica nelle vicinanze di Alonte, Colli Iberici (Vicenza, Italia)* - Il Quaternario *Italian Journal of Quaternary Sciences*, 8(2), 1995, 443-448 - In un riempimento carsico esposto in una cava di calcare presso Alonte nei Colli Berici meridionali (Vicenza) sono stati raccolti scarsi resti di mammiferi continentali. I fossili erano inglobati in una lente di sedimento argilloso ed hanno subito un forte processo di alterazione che ha risparmiato quasi esclusivamente resti di dentatura. L'associazione, nonostante il basso numero di reperti determinati, è abbastanza diversificata e comprende i seguenti taxa: *Ursus* cf. *etruscus*, un elefante, rappresentato solo da lamelle isolate di denti giugali e riferito a *Archidiskodon* cf. *meridionalis*, *Stephanorhinus* cf. *etruscus*, *Equus* sp., presente con frammenti di molari e con un'estremità distale di metapode di piccola taglia, *Pseudodama* sp., *Leptobos* cf. *etruscus* e un solo molare dubitativamente riferito a *Leptobos* aff. *furtivus*. L'associazione di *Leptobos* *etruscus* e di *Leptobos* aff. *furtivus* permette di collocare i fossili di Alonte nell'unità faunistica Tasso del Villafranchiano superiore ed indica una collocazione cronologica nel primo Pleistocene Inferiore. La fauna di Alonte, anche se molto fannullona, è il più antico ritrovamento di mammiferi fossili dei Colli Berici ed è la quarta fauna villafranchiana del Veneto, assieme a quelle di Cava Sud, Rivoli Veronese e Steggio. Questa documentazione fossile dimostra che la fascia pedemontana della pianura veneta era completamente emersa probabilmente a iniziare dal tardo Pliocene superiore, e che comunità di mammiferi ben diversificate vivevano in questa area e nell'entroterra vicina.

ABSTRACT - *Late Villafranchian mammals from a karst fissure at Alonte, Berici Hills (Vicenza, NE Italy)* - Il Quaternario *Italian Journal of Quaternary Sciences*, 8(2), 1995, 443-448 - Remains of terrestrial mammals were found in a limestone quarry close to the village of Alonte in the southern Berici Hills, near Vicenza in NE Italy. The fossils came from two small conglomerate lenses interbedded within clayey reddish continental sediments ("terre rosse") that fill a karst fissure intersected by quarrying activity. The fossil remains are deeply weathered and consist of isolated teeth and small bone fragments. Despite the scarcity of specimens, the mammal assemblage is fairly diversified and includes the following taxa: *Ursus* cf. *etruscus*, an elephant tentatively referred to *Archidiskodon meridionalis*, *Stephanorhinus* cf. *etruscus*, *Equus* gr. *stenonis*, the smaller deer *Pseudodama* sp., *Leptobos* cf. *etruscus* and a molar which has tentatively been referred to *Leptobos* aff. *furtivus*. This fossil assemblage indicates a late Villafranchian age. The occurrence of the two *Leptobos* species suggests that the Alonte mammals may be placed within – or very close to – the Tasso faunal unit, indicating an old Early Pleistocene age for it. The Alonte fauna, although represented by few specimens, is – at the time – the oldest record of fossil mammals in the Berici Hills, and is the fourth record of Villafranchian assemblages in the Veneto region, together with faunas from Cava Sud, Steggio, and Rivoli Veronese. The Alonte faunal record shows that the foothills in the Veneto plain were totally emerged since probably the late Pliocene and that rich and diversified mammal communities lived in the area.

Key-words: Mammalia, early Pleistocene, late Villafranchian, Northeastern Italy

Parole chiave: Mammalia, Pleistocene inferiore, Villafranchiano superiore, Italia nord-orientale

1. FOREWORD

Villafranchian mammals were discovered at the Alonte quarry during an investigation on exotic sediments from the Berici Hills and the Vicenza Prealps, carried out by one of the authors (P.A. Vorlicek). Exotic pebbles and sand can be in morphological traps such as paleokarst networks which are common throughout the Berici Hills and the Vicenza lower Prealps (Mietto, 1988; Mietto & Zampieri, 1988; Mietto & Sauro, 1989; Vorlicek, 1991).

About 500 m to the E of the village of Alonte there is a large quarry in limestones displaying the typical Priabonian facies (Late Eocene in age).

Quarrying has progressively exposed a network of karst fissures filled with various sediments. Most cavities are filled with red earths, i.e. residual clays rich in iron oxides. The others, however, are filled with exotic sediments, consisting mainly of quartz-rich sands and crystalline rock pebbles (among which the most common are quartz elements) often glazed by iron oxides. A fissure filling containing mammal remains together with quartz-rich pebbles was already reported by Vorlicek (1991).

In 1994, scattered mammal teeth and bone fragments were found on the floor of the quarry. The fissure filled by the fossils bearing deposit was localized with the help of our friend and colleague Dr. Enrico Trivellin, and consisted in a sub-horizontal conduit – about 1.6 m long and 0.8 m high on average – which likely was the

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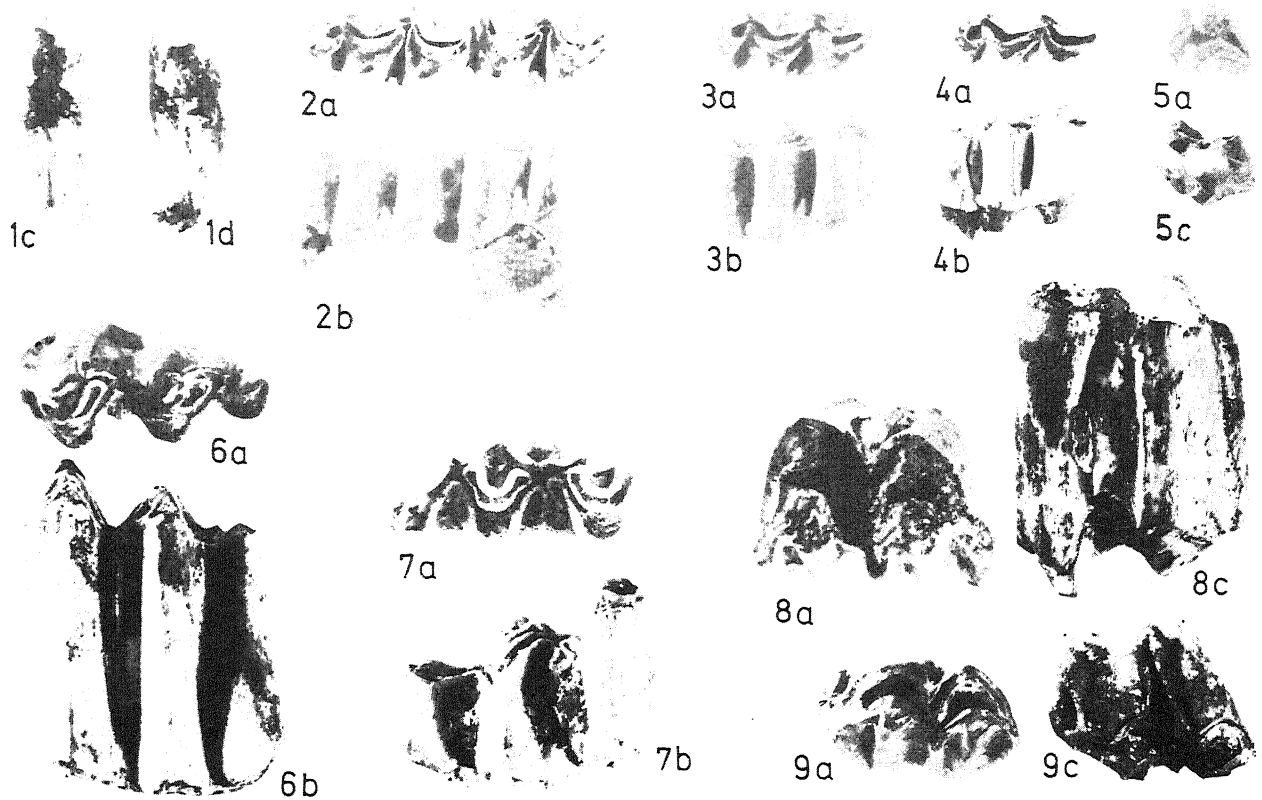


Fig. 1 - *Ursus cf. etruscus*: 1, left I3/. *Pseudodama sp.*: 2, left M/2+3; 3 and 4, left M/3; 5, right P2/. *Leptobos cf. etruscus*: 6, left M/3; 8, right M/3; 9, right D4/. *Leptobos aff. furtivus?*: 7, right M/3. a) occlusal, b) buccal, c) lingual, d) distal views (natural size).

Ursus cf. etruscus: 1, I3/ sinistro. *Pseudodama sp.*: 2, M/2+3 sinistri; 3 & 4, M/3 sinistri; 5, P2/ destro. *Leptobos cf. etruscus*: 6, M/3 sinistro; 8, M/3/ destro; 9, D4/ destro. *Leptobos aff. furtivus?*: 7, M/3 destro. Visioni: a) oclusale, b) buccale, c) linguale, d) distale (grandezza naturale).

terminal part of a larger karst system. The fossil material was soon collected and a rough stratigraphic scheme was made before the site was destroyed by quarrying.

The following units were identified (from bottom to top):

- 1) 15 ÷ 30 cm thick conglomerate with bones and quartz-rich pebbles embedded in reddish clays with iron oxide concretions. With the exception of teeth, fossil remains larger than 1 cm were rounded, suggesting deep weathering.
- 2) 10 ÷ 15 cm thick non-fossiliferous residual clays with carbonate cement.
- 3) About 10 cm thick irregularly bedded bony conglomerate, similar to unit 1.
- 4) Mostly non-fossiliferous clays with a secondary cement.

Sedimentological and mineralogical analyses (Vorlicek, in progress) have shown that the sediment has a bimodal grain size distribution suggesting a mass transport process.

Fossils are heavily weathered; only bony fragments

and teeth, or parts of teeth, are preserved. Some specimens are whitish and chalky, though most are dark coloured, because of iron and manganese oxide glazes. Weathering has destroyed most of the roots of teeth; crown cement is rarely preserved.

2. SYSTEMATICS

Despite the small number of specimens collected and their poor preservation degree, the mammal assemblage is fairly diversified, and includes six taxa.

2.1 Carnivora

Ursidae

Ursus cf. etruscus Cuvier, 1812

The presence of bears in the assemblage is shown by a single third upper incisor, consisting of the crown and most of the root. The crown is moderately worn on the occlusal and mesio-lingual sides; it has a large main cusp and a lingual cingulum ending in a small mesial lobe. Diameters at the tooth neck (mesio-distal: 16.4 mm; buccal-lingual: 12.2 mm) fall within the overlap zone of the dimensional variation fields of *Ursus etruscus* and

(1) Material preserved at the Museum of Geology & Paleontology (University of Florence)

Ursus deningeri I3/s.

Several morphological features suggest that the Alonte incisor is closer to that of the Villafranchian species *Ursus etruscus*. In specimens of *U. etruscus* from the Upper Valdarno⁽¹⁾ and in the Alonte incisor, the mesial lobe is weak, and the main cusp is located centrally with respect to the tooth axis. In *Ursus deningeri* the main cusp is located in a more buccal position, and even more so in *U. spelaeus* and *U. arctos*. The labial cingulum and the lobe are weak in *Ursus etruscus*, while they are stronger in *Ursus deningeri*, *Ursus spelaeus*, and *Ursus arctos* (cfr. Torres, 1988, p. 672). Furthermore, the lobe forms a sharp angle in occlusal view in the two more recent species. In *U. deningeri* from Isernia-La-Pineta the characteristic is variable: the mesio labial edge of the 3rd upper incisor is rounded in specimens in which the lobe is weak, whereas it resembles *U. spelaeus* when the lobe is stronger.

2.2 Proboscidea

Elephantidae

Archidiskodon cf. *meridionalis* (Nesti, 1825)

Six small fragments of enamel plates can be referred to at least one elephant tooth. Enamel thickness varies from 2.8 to 3.2 mm, its surface is slightly rugose, and plates are flat or slightly folded. It is not possible to determine if the remains are from a deciduous or a definitive tooth. If plates are from a definitive molar, the specimen's relatively low enamel thickness could fit the variation field of a recent form of *A. meridionalis*, according to data from Aguirre (1968) and Garrut & Bajgusheva (1981). The slight folding of plates, furthermore, would rule out the possibility that they be either from *Paleoloxodon namadicus* or *Mammuthus armeniacus*.

If the general characteristics of the assemblage and the morphological features of the tooth are taken into account, we can tentatively refer our specimens to a recent form of southern elephant.

2.3 Perissodactyla

Rhinocerotidae

Stephanorhinus gr. *etruscus* (Falconer, 1868)-*hundsheimensis* (Toula, 1902)

The occurrence of a rhinoceros of the genus *Stephanorhinus* in the Alonte fauna is accounted for by some fragments of upper and lower molars and premolars.

Direct comparisons rule out the possibility that the fragments belong to *Stephanorhinus kirchbergensis*, a species whose teeth tend to be on the average large, and the crowns of upper molars inflated and bulbous on the lingual side. Teeth of *Stephanorhinus hemitoechus* differ from those of the Alonte specimens because they are more hypsodont, have a V-shaped trigonid valley, and more commonly have a distal-lingual cingulum in the lower molars (see Fortelius *et al.*, 1993).

Remains from Alonte more closely resemble the *Stephanorhinus etruscus* and *Stephanorhinus hundsheimensis* teeth; however scarceness of samples prevents a specific determination on morphological grounds to be made. If the assemblage is considered as a whole, it can be said that the material likely belongs to the *etruscus* species.

Equidae

Equus gr. *stenonis* Cocchi, 1867

The occurrence of a horse is shown by fragments from at least one upper jugal tooth and a distal extremity of a metapodial. The size of dental fragments cannot be estimated, while the fragment of metapodial – the surface of which is somewhat eroded – has a size (greatest breadth of ephyphysis = 41 mm; greatest articular breadth = 37 mm; greatest articular depth = 29 mm) falling in the variation field of the small stenonian Villafranchian horse *Equus stehlini*.

2.4 Artiodactyla

Cervidae

Pseudodama sp.

This small deer is represented by a P2/, a P/2, a M/2, five right M/3 (two of which are fragmented), a fragmented D/4, several dental fragments, and a distal articular fragment of a left humerus. The remains are from at least six individuals, one of which still having milk teeth. The occurrence of such an unbalanced number of right M/3 specimens suggests that the fossil assemblage of the fissure deposit derived from a much larger taphocenosis. This agrees with the observed high taxonomic differentiation of the assemblage with respect to the small number of specimens collected.

The teeth are slightly worn with the exception of the P/2; the upper premolar is molarized, with a deep lingual groove that divides the lingual wall into two lobes; a small labial stilid is present between the mesial and distal lobes. Measurements (in mm) are as follows:

	basal length	maximum breadth	height
P2/	11.2	11.6	10.3
P/2	10.6	6.1	6.4
M/2	17.2	11.3	8.5
M/3	22.8	11.2	10.5
M/3	22.2	10.2	11.1
M/3	19.7	9.1	10.6

Morphology and size of dental remains is in accordance with those of the genus *Pseudodama* (Azzaroli, 1992), but are not sufficient for a more specific determination.

Bovidae

Leptobos cf. *etruscus* (Falconer, 1868)

This bovine is represented by a left M/3, a distal fragment of a left P/4, a fragmented right D/4, M3/ and

M1/ from the same individual, a fragmented right P2/, a right D4/, and several fragments of dental crown. The remains are from at least three individuals, one of which had deciduous dentition.

The best preserved specimens show the following measurements (in mm):

	basal length	occlusal length	max breadth	occlusal breadth	height
D4/	20.5	26.4	17.2	13.0	17.0
M1/	25.3	26.1	26.2	20.6	20.5
M3/	28.6	31.7	26.9	23.3	34.9
M/3	35.0	32.8	14.3	12.1	40.7

The molars are less hypsodont than those of *Bos* or *Bison*, including the less derived form of subgenus *Eobison*, but are distinctly more hypsodont than it is observed in *Leptobos merlai* and *Leptobos furtivus* from the late Pliocene localities of Western Europe. A number of morphological features conform with those of the *Leptobos* of the etruscoid group (i.e., *Leptobos etruscus* and *Leptobos vallisarni*): a flattened entostilid, fused to the lingual wall of the talonid at its base; the pillars of conids which are distinctly delimited, and a strong mesostyle of upper molars. In particular, the moderately developed entostyle and ectostylid, the occurrence of a metastylid in the upper part of the crown of lower molars, the rather flattened anterior wall, and the distally directed metastyle in upper molars are features commonly found in derived forms of *L. etruscus* and in *L. vallisarni*. The wide flattened metaconid of the P/4 is another feature occurring in advanced etruscoid forms (e.g., *L. aff. vallisarni* from Pietrafitta).

These features allow us to exclude that Alonte specimens belong to older and less derived forms of *L. etruscus* such as those from Olivola (Val di Magra) of latest Pliocene age (Merla, 1949) or Senèze (Central Massive, France) also of the latest Pliocene (Schaub, 1943; Douvenois, 1990), thus restricting the systematic attribution to an advanced form of *L. etruscus* or to *L. vallisarni*.

Leptobos aff. furtivus (?) Douvenois, 1989

A single right M/3, heavily worn and partially fragmented, shows strongly bulging lingual pillars separated by a very deep groove, and a well developed entostylid which reaches the base of the crown. These features are found in specimens from the Upper Valdarno that belong to *Leptobos aff. furtivus*, an advanced form of the *furtivus* narrow-nosed ox (Masini, 1989). Measurements, in mm, are: basal length = 35.3; occlusal length = 36.0; maximum breadth = 17.7; height = 21.3. Because the material at our disposal was scarce, the systematic assessment is, however, uncertain.

At present, *L. aff. furtivus* is known in Italy only in assemblages from the Upper Valdarno belonging to the Tasso faunal unit (De Giuli & Masini, 1987; Masini, 1989).

3. REMARKS

Even if the mammal fauna of the Alonte quarry consists of just a few specimens, it is an important addition to the fossil record. In fact, it is the oldest mammal assemblage found to this date in the Berici Hills, and is the fourth finding of Villafranchian mammals in Veneto region, after the faunas from "Cava Sud" (a locality in the Verona Lessini Mts.) (Pasa, 1948; Torre *et al.*, 1992), and those from the recently discovered localities of Steggio (Possagno, near Treviso) (Sala & Tonon, 1992) and Rivoli Veronese (Caprino, near Verona) (Sala *et al.*, 1994).

The fossil mammals from Alonte may belong to a generic late Villafranchian assemblage. However, the occurrence of *Leptobos cf. etruscus* with advanced tooth morphology and a single molar referred to *L. aff. furtivus* suggests that this fauna occupies a more restricted biochronological position, within – or very close to – the Tasso faunal unit. This unit has recently been calibrated with paleomagnetic methods to just above, or very close to, the top of Olduvai sub-chron, which places it at the beginning of the Pleistocene (Torre *et al.*, 1993). The biochronological position of the Alonte finds would therefore indicate an old Early Pleistocene age.

The other Villafranchian assemblages of Veneto region have different ages: the Rivoli Veronese and Steggio faunas are older (Late Pliocene) whereas that from "Cava Sud" is younger (late Early Pleistocene). These faunal records demonstrate that the foothills in the Veneto plain were totally emerged probably since the Late Pliocene, and that rich and diversified mammal communities lived in the area.

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