



INQUA – SEQS

**Subcommission on European
Quaternary Stratigraphy**

Quaternary Stratigraphy and Evolution of the Alpine Region in the European and Global Framework

Volume of Abstracts

edited by Roberta Pini and Cesare Ravazzi

Milano, 11 – 15 September 2006

Dipartimento di Scienze dell'Ambiente e del Territorio
Università degli Studi di Milano - Bicocca



C.N.R. – Istituto per la Dinamica dei Processi Ambientali, Milano



INQUA – International Quaternary Association



Università degli Studi di Milano - Bicocca

Large and small mammal biochronology and chronostratigraphy from the Late Pliocene to the Middle Pleistocene of the Italian peninsula

F. Masini¹, B. Sala²

¹Dipartimento di Geologia e Geodesia, Università di Palermo, C.so Tukory 131, 90134 Palermo Italy; ²Dipartimento delle Risorse Naturali e Culturali, Università di Ferrara, C.so Ercole I D'Este 32, 44100 Ferrara, Italy

A review on mammalian biochronology of the Italian peninsula is presented. Large and small mammal biochronological successions and their correlation to the geochronometric scale are discussed, according to the integrated methodology and data of Sala and Masini (2004), Masini and Sala (2004 and in press). The integration between the two scales has been done directly, through the localities which yielded a rich record of both large and small mammals, which represent a sort of "landmarks" for correlation. The different body size that distinguishes the "large" from the "small" mammals, however, strongly influences the taphonomy of the two groups, their recovery and the methods required during collection. For this reason localities with sound documentation of both large and small mammals are not so frequent, particularly in the Pliocene and the Early Pleistocene, with some noticeable exception. This results in a certain degree of uncertainty in some details of the proposed correlation framework. This integrated approach, on the other hand, allows the constraint of the sequence of large- and small- mammal events in a more reliable way, and therefore it results in a more detailed and consistent chronological use of mammalian assemblages. The biochronological framework has been integrated into a chronostratigraphical scheme by means of radiometric and magnetostratigraphical calibration and marine - continental correlations available from several sites (Fig. 1).

The Montopoli local fauna represents the basal fauna of the Middle Villafranchian, where important dispersals occur among large mammals (e.g. *Equus* and *Archidiskodon*), found just above the Gauss Matuyama transition and therefore correlated to the Middle - Late Pliocene transition. The Montopoli F.U. apparently correlates with the late part of the *Mimomys polonicus* zone of the Early Villanyian of the small mammal European chronology.

The large mammal assemblages of the Middle Villafranchian are not much represented in the Italian peninsula (Costa San Giacomo F.U.) and the transition to the Late Villafranchian is rather gradual. The Olivola F.U. (the first unit of the Late Villafranchian) records a change in faunal composition that yet retains continuity with the Costa San Giacomo F.U. In the Olivola F.U. *Leptobos etruscus* is the most widespread bovid, and *Eucladoceros dicranios - ctenoides* and *Pseudodama nestii* appear. The presence, among the carnivores, of *Pachycrocuta brevirostris* and *Panthera gombaszoegensis* are also notable. The upper part of the Middle Villafranchian and the first unit of the Late Villafranchian (Olivola F.U.) correlate with the *Mimomys pliocaenicus* zone (Late Villanyian). Remarkable small mammal localities are Montagnola Senese (Central Italy) and Rivoli Veronese (N-E Italy); in the latter locality *M. pliocaenicus*, *Mimomys tornensis* and *Mimomys pitymyoides* occur together with *Ungaromys dehmi* and *Villanyia*. Local faunas of the Olivola F.U. and faunas transitional to the next unit, the Tasso F.U., are rather common in the Upper Valdarno Basin. Magnetic investigations have allowed the correlation of these faunas to an interval that extends from the reverse polarity Matuyama Chron above the Reunion Event and the greater part of the Olduvai Subchron.

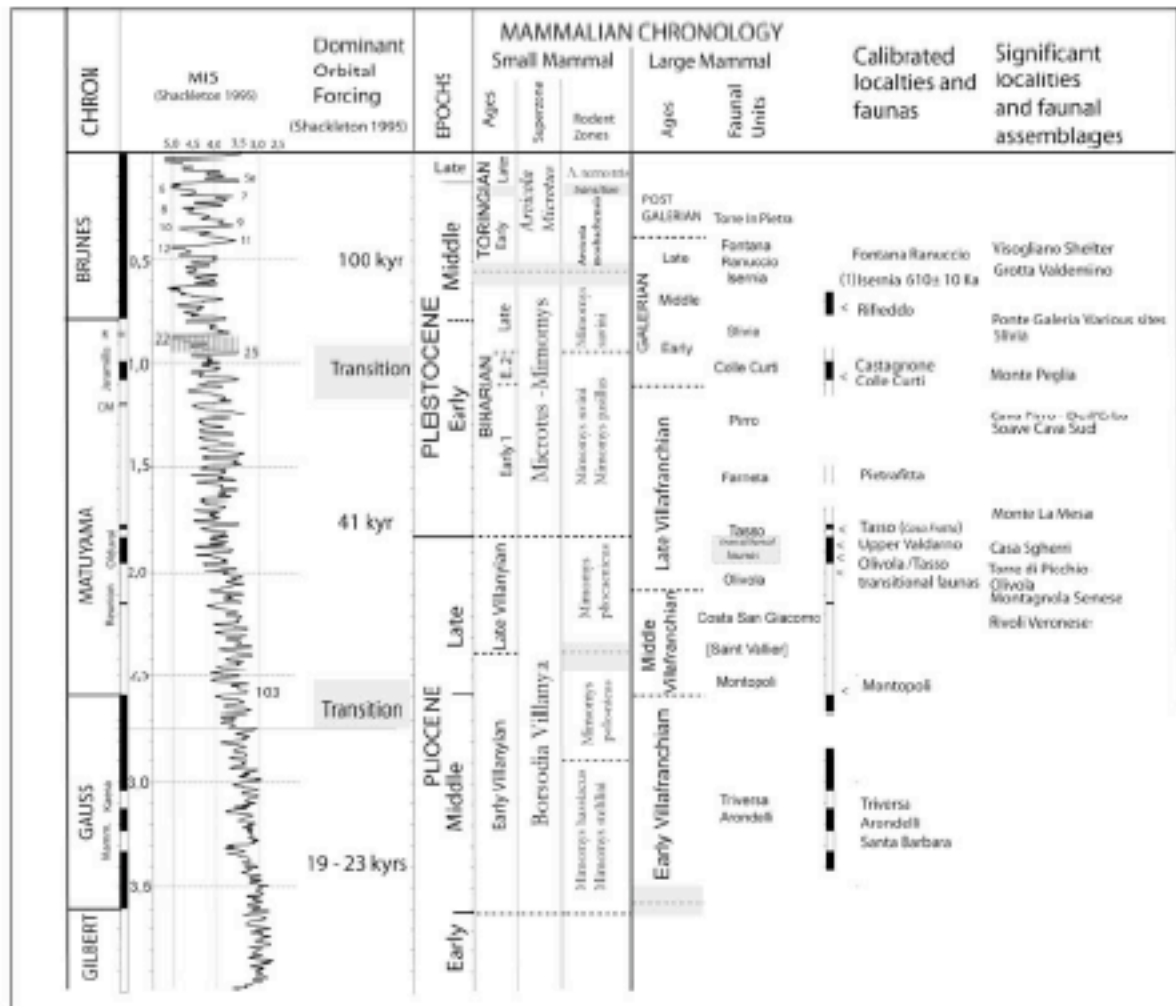


Fig. 1: Chronological scheme (after Masini and Sala, in progress, modified)

The subsequent Tasso F.U. includes some novel elements, such as the occurrence of *Praeovibos*, of a primitive lycaon (*Lycaon falconeri*), of a derived form of medium-sized deer (*Pseudodama eurygonos - farnetensis*), of *Equus stehlini* and of *Leptobos vallisarni*, a stouter relative of *Leptobos etruscus*. The transition from the Olivola to the Tasso F.U. is known from the Upper Valdarno Basin, where fossil-bearing sediments from the two stratigraphically superposed units are exposed. This transition has been correlated magnetostratigraphically close to the top of the Olduvai Subchron, which is around the basal Pleistocene boundary (GSSP at La Vrica Section, Fig. 1). The finds of *Mimomys savini* (a marker taxon of the Biharian) in two localities of the Upper Valdarno in sediments which are considered as the reference for the Tasso F.U. suggest that this unit can be correlated with the Early Biharian. The Villanyian - Biharian transition, therefore, approximately corresponds to the transition from the Olivola to the Tasso faunal units and to the Plio - Pleistocene boundary. *Microtus (Allophaiomys)*, another important taxon of the Early Biharian, became the most widespread arvicolid, often associated to *Mimomys pusillus* (Monte La Mesa, Venetia; Pietrafitta, Umbria; Cava Piro, Apulia). Soave Cava Sud, Venetia represents a chronological succession of Early Biharian faunas.

The next important faunal changes are found in faunas correlated the Jaramillo Subchron and correspond to the beginning of the Galerian Mammal Age. The Colle Curti fauna (Central Apennines) is the first faunal unit of the Galerian Mammal Age; it records the first finds of

Praemegaceros verticornis and of *Bison* (*Bison*). The most important small-mammal localities correlated with Colle Curti are Castagnone (Piedmont) and Monte Peglia (Umbria) where *Microtus* (*Allophaiomys*) *burgondiae*, *Microtus* (*Allophaiomys*) *nutiensis*, *Mimomys savini*, *Mimomys blanci*, *Ungaromys nanus* occur. Castagnone and Colle Curti are normally magnetised and are referred to the Jaramillo Subchron, confirming the correlation of the Colle Curti F.U. with the upper part of the Early Biharian. The Colle Curti F.U. and the later part of the Early Biharian, as above defined, foreshadow the most important faunal change of the Pleistocene. During this renewal, the Villafranchian taxa became extinct or, in some cases, gave rise to new species more adapted to arid, cold climates. Here the Galerian forms appear together with some of the direct ancestors of the "modern" faunal elements through a sequence of dispersal events.

Within the Slivia and the following Isernia faunal units many important large mammals events occur: e.g the spread of *Bison schoetensacki*, *Capreolus*, *Cervus elaphus acoronatus*, *Crocuta crocuta*, *Panthera leo fossilis*, *Panthera pardus*, *Dama clactoniana*, *Hemihos galerianus*, *Praemegaceros solihachus*, *Mammuthus trogontherii*, *Elephas antiquus*, *Stephanorhinus kirchbergensis* and *Ursus deningeri*. The Slivia F.U. correlates directly with the Late Biharian based on the occurrence of *Microtus* (*Stenocranius*) and *Microtus* (*Terricola*), associated with *Mimomys savini*. The Rifreddo locality (Basilicata) has yielded a slightly younger Late Biharian small mammal fauna, equated to the early part of the Brunhes Chron, which records the first occurrence of *Microtus* (*Iberomys*) and of *Microtus* (*Terricola*) *arvalidens*. The archaeological site Isernia La Pineta (Molise) correlates to the beginning of the Toringian for the occurrence of the "marker" vole *Arvicola mosbachensis* which, however, still retains some molars with incipient roots. Important large mammal taxa include *Praemegaceros solihachus*, *Hemitragus bonali*, *Dama clactoniana* and *Capreolus* sp., while significant small mammal taxa include *Pliomys episcopalis*, *Pliomys lenki*, *Microtus* aff. *arvalis*, *Microtus* (*Iberomys*) *brecciensis* and *M. (Terricola)* ex gr. *multiplex-subterraneus*. The Grotta Valdemino fauna (Liguria) is a good example of a "warm assemblage" of the early Toringian - Middle Galerian, while the thick archaeological sequence of Visogliano Shelter (Friuli Venezia Giulia) records a warm to cold climatic oscillation of the Toringian - Late Galerian. *Crocidura*, *Microtus* (*Terricola*) cf. *arvalidens*, *Macaca* and fairly abundant *Dama clactoniana* occur in the temperate climate lower levels. Significant occurrences within the upper cooler climate levels are those of the narrow-skulled vole *Microtus* (*Stenocranius*) *gregalis*, the pika (*Ochotona* sp.), the suslik (*Spermophilus* sp.) and the argali (*Ovis ammon*).

References

Masini F., Sala B. (2004) - *Stratigraphic distribution patterns of large and small mammals in the Late Pliocene and Pleistocene of the Italian Peninsula: an integrated approach*. 32nd IGC, Florence, 20-28 August 2004. Scientific Sessions: abstracts (part 2): 1135.

Masini F., Sala B. - *Large and small mammal distribution patterns and chronostratigraphic boundaries from the Late Pliocene to the Middle Pleistocene of the Italian peninsula*. In progress.

Sala B., Masini F. (2004) - *The Late Pliocene and Pleistocene small mammal chronology in the Italian Peninsula*. 32nd IGC, Florence 20-28 August 2004. Scientific Sessions: abstracts (part 2): 1137

Sala B., Masini F. (2004) - *The Late Pliocene and Pleistocene small mammal chronology in the Italian Peninsula*. Quaternary International, submitted.