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DINAROMYS BOGDANOVI (MAMMALIA: RODENTIA) FROM THE MIDDLE PLEISTOCENE OF WESTERN LOMBARDY (ITALY)

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Riassunto. Si riporta il rinvenimento di *Dinaromys bogdanovi* del Pleistocene Medio nell'area di Campo dei Fiori (Varese). Questa segnalazione viene ad estendere verso occidente l'areale di distribuzione di questa specie precedentemente conosciuta fino alla Lombardia orientale.

Abstract. The finding of *Dinaromys bogdanovi* of Middle Pleistocene age in the area of Campo dei Fiori (Varese) is described. It extends westward the distribution of this species, known previously up to eastern Lombardy only.

Introduction.

The discovery in the autumn of 1988 of a new cave, at an altitude of just over 1000 meters on the Massiccio di Campo dei Fiori, initiated the excavation of an extremely interesting site, that ultimately proved highly useful in the study of the Lombardian Pleistocene fauna.

The importance of these findings in the cave is due not only to the extensive collection of fossils discovered in the site, but also to the fact that, until recently, excavations in Lombardy, carried out stratigraphically from base to top, were quite exceptional. However, in this case, the entire excavation was, from the beginning to the end, conducted in a systematic manner combining the study of the sediments and stratigraphy of the deposit with the retrieval of palynological and faunistical materials for analysis.

Until now, a considerable amount of *Ursus spelaeus* Rosenmüller & Heinroth, 1794 bones (Tintori & Zanalda, 1992; Tintori et al., 1993) has been recovered, coming from various levels and dated using the radiocarbon method and amino acids racemi-

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zation. Fossils recovered in higher levels are about 22,000 years BP, while those older lie on a calcareous concretion that was dated with U/Th at older than 350,000 years BP (Bini, pers. comm.). The bear is the only large mammal present in the cave.

Furthermore, various species of small mammals have been found by using a 0.5 mm diameter sieve. Of particular interest among these findings is a right ramus of the mandible of the genus *Dinaromys* Kretzoi, 1955, found in a level located about one meter below the above-mentioned calcareous concretion. In the same level are also present: dominant bats, abundant dormice, *Clethrionomys* sp., *Microtus nivalis* (Martins, 1842) and *Apodemus* gr. *sylvaticus-flavicollis,* each one represented by a single specimen.

This paper describes and illustrates the *Dinaromys* found and discusses the importance of this finding in western Lombardy, because it evidences to the westernmost expansion of this genus.

Description of the find.

The finding is a right mandible ramus of *Dinaromys*, broken at both the buccal and lingual sides (Fig. 1b and 1c), but still containing all the teeth: the incisor and three molars. The length of the mandible from the condyle to the incisor alveolus is 17 mm; the M1-M3 length measured on the occlusion surface is 8.5 mm, while at the alveolar level, it is 9.2 mm.

M1 -

The tooth is composed of a posterior lobe, three closed triangles and an anteroconid, where the fourth and the fifth triangle are slightly connected. There are four buccal re-entrant angles and four lingual ones.

In addition, there is a smooth inflexion on the anterior lobe which indicates a possible fifth lingual re-entrant angle (Fig. 1a). There are also five lingual and four buccal salient angles. The triangles are of a "*Microtus*" morphological type.

The enamel is thick and differentiated, thickness diminishing on the convex side of the triangles close to the re-entrant angles. The first part of the synclines is filled with cement. On the buccal side the *linea sinuosa* reaches to the back of the occlusal surface (Fig. 1c), and so the enamel is interrupted (Fig. 1a); on the contrary, on the lingual side the *linea sinuosa* is stopped below the occlusal surface (Fig. 1b). The cement is firmly present and fills only the first part of the re-entrant angles.

The length of M1 is 3.7 mm, measured on the occlusal surface.

M2 -

The second molar is composed of a posterior lobe and four isolated triangles (Fig. 1a). The lingual triangles are larger than the buccal ones. No particular morphological features are observed. The length of this tooth is 2.3 mm, measured on the occlusal surface.

M3 -

The two lingual re-entrant angles are well shaped, while the buccals are large but not very deep (Fig. 1a); thus, the first and the second triangle are linked as well as the third and the fourth, producing a rhomboid shape.

On the mandible lingual side, the tooth roots are visible and well developed (Fig. 1b). The length of M3 is 2.3 mm, measured on occlusal surface.

M1 - M3 alveolar = 9.2 mm.
M1 - M3 occlusal surface = 8.5 mm.

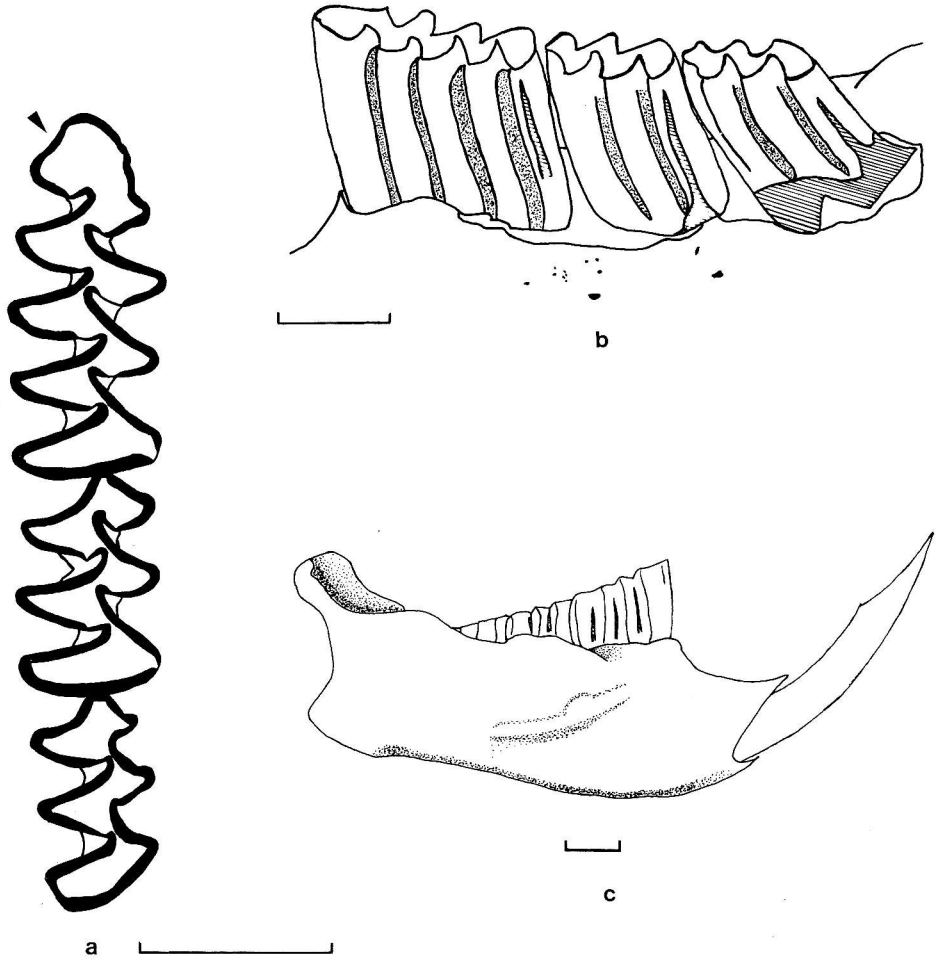

Fig. 1 - *Dinaromys bogdanovi* (V. et E. Martino, 1922). a) Dental row, proximal view; the black arrow indicates a smooth inflexion, a possible fifth lingual re-entrant angle. b) Dental row, lingual view. c) The right ramus of the mandible, buccal view. Scale bars equal 2 mm.

Discussion.

The presence of roots and the dimensions of the specimen point to the fact that the fossil belongs to the tribe Clethrionomyini Hooper & Hart, 1962. The taxonomic status of *Dinaromys* is controversal (Petrov & Todorovic, 1982); in fact the genus has been allocated also to Ondatrini (Corbet, 1978) and Pliomyini (Kretzoi, 1969).

The presence of cement, the differentiated enamel and the considerable size exclude the possibility that the sample belonged to the genus *Pliomys* Méhely, 1914 (without cement), or to the genus *Clethrionomys* Tilesius, 1850 (of smaller dimensions and undifferentiated enamel). The specimen may therefore be attributed to the genus *Dinaromys* (Gromov & Poliakov, 1992).

The morphology of the specimen is well whitin the form of the *Dolomys* (recte *Dinaromys*) *bogdanovi* group *pasai* described by Bartolomei (1969, 1970), who analyzed *Dinaromys* samples from thirteen Pleistocene deposits in Veneto and Carso Triestino. In particular, this find from Campo dei Fiori corresponds to the young-adult stage of development of *Dinaromys bogdanovi* (V. et E. Martino, 1922). In the young, the first lower molar is complicated by the presence of re-entrant angles on both sides of the anterior lobe and sometimes in its anterior part as well. Such complications tend to disappear as soon as wear of the teeth begins. Therefore, the weak inflexion on the lingual side of the anterior lobe of the lower M1 (Fig. 1a) could be the remains of a previous re-entrant angle.

The fact that the animal was in the young-adult stage of its life is confirmed by the presence of highly developed roots, easily visible on the lingual side of the mandible, due to the fracture (see Fig. 1b). It has been observed in living species that the development of molar roots in the genus *Dinaromys* begins at sexual maturity (Martino, 1948).

Bartolomei (1969), in his comparison of finds from various sites, distinguishes two groups, characterized by two different morphologies of lower M3. In one group, the re-entrant buccal angles are wide and shallow, so that the first and second triangles, and the third and fourth, converge to form two rhombs. The second morphology is instead characterized by the complete development of the re-entrant angles on both the buccal and lingual sides through to the tooth's axis, so resulting in quite distinct and separate triangles.

From the preceeding description of the Campo dei Fiori specimen, it is clear that the finding belongs to the first group (Fig. 1a). Another interesting feature of this specimen is that the vertex of the fourth re-entrant lingual angle and the third buccal of M1, rather than being opposite to each other, are distinctively displaced and almost form a sixth triangle. This morphology, observed by Todorovic' (1956) in actual *Dinaromys bogdanovi* from Bosnia-Montenegro, and in several examples from Veneto (Bartolomei, 1969), has an evolutionary significance in that the sixth triangle strengthens the tooth. This character seems to indicate a more advanced evolutionary form with respect to those with opposite angles. In fact, as it was noted, throughout the

course of evolution of Arvicolini the number of triangles of the first lower molars increased in the anterior part of the tooth (Chaline, 1980).

Conclusion.

The specimen found at Campo dei Fiori is the second finding of the genus *Dinaromys* in Lombardy; the first records relate to M. Paitone (Gavardo, prov. Brescia) (Bartolomei, 1969). Only a single specimen was found in that case also: a mandible, of a senile individual, with the first two molars intact. Due to some peculiar characters the mandible was not attributed to any species of *Dinaromys*. Numerous specimens of *Dinaromys bogdanovi* were found in Veneto and in Carso Triestino (Bartolomei, 1964, 1969).

The appearance in Italy of *Dinaromys bogdanovi* dates back to the early Galerian (Sala, 1992; Sala et al., 1992) and is testified by the Slivia fauna from Carso Triestino (Ambrosetti et al., 1979), where *Allocricetus bursae* also appears for the first time. Its appearance in Italy seems therefore to coincide with the great faunal renovation (Azzaroli et al., 1988; Sala, 1992) at the beginning of the Middle Pleistocene.

Therefore, the significance and the importance of the mandible of *Dinaromys bogdanovi* found at Campo dei Fiori consists in the fact that it testifies the maximum western expansion of this genus so far known. Furthermore, the find is relatively old because of its position under the calcareous concretion dated with the U/Th method older than 350,000 years BP.

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