# *DOLOMYS* (ARVICOLIDAE, RODENTIA, MAMMALIA) IN THE DACIC BASIN (ROMANIA)

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Three species of *Dolomys* are known from the upper Pliocene (upper Romanian) in the Dacic Basin : *D. nehringi* at Podari (Jiu valley), *D. milleri* at Milcovu din Vale and Slatina-1, and *D. ferui* n. sp. at Cherleştii-Moşteni (type-locality) and Slatina-2 (Olt valley). *D. ferui* n. sp. including the last members of the genus is characterized by a larger size and a different dental morphology as compared with the other species of *Dolomys*. The three species are considered to represent a single lineage from *D. nehringi* to *D. ferui* n. sp. through *D. milleri*.

## 1. INTRODUCTION

Investigations in the Dacic Basin since 1977 are of special interest for the light thrown on the mammalian microfaunas of the end of the Pliocene and early Pleistocene (Feru, Radulesco & Samson 1978, 1979, 1983). Findings from Podari in the Jiu valley and a series of localities in the Olt valley (Slatina area) are of special importance.

A study of palaeomagnetism carried out at Slatina has assessed the correlation of the most important fossiliferous horizons to the magnetic polarity time scale (Andreescu, Radulescu, Samson, Tchépalyga & Troubikhine 1981).

The analysis of samples of *Dolomys* from five localities in the Dacic Basin showed that the youngest members of the genus were distinguished by a larger size and a different occlusal pattern of $M_1$. This paper is concerned with the description of a new species of *Dolomys* based on the material from Cherleştii-Moşteni and Slatina-2.

Dental terminology and measurements (in mm) are after van der Meulen (1975), Rabeder (1981) and Chaline & Laurin (1986). Two other measurements taken by us are indicated in Figs. 3a, 1c—3c).

The fossils used in this study are in the collections of the Speleological Institute, Bucharest.

## 2. STRATIGRAPHY

### CHERLEŞTII-MOŞTENI (code CM)

This locality is situated in the Olt valley, approximately 13 km north of Slatina. A stratigraphic section, 3 m thick, made by excavations, located in the south-western extremity of Cherleştii-Moşteni, showed a succession of clays and siltic clays containing two fossiliferous levels in which mammalian remains were associated with a fresh-water molluscan fauna (Feru & al. 1978, Andreescu & al. 1981).

The mammals from the two fossiliferous levels are as follows :

| | lower level (layer 3) | upper level (layer 4) |
|---|---|---|
| *Desmana nehringi* Schreuder | + | — |
| *Trogontherium minus* ssp. | + | + |
| *Allactaga ucrainica* Gromov & Shevchenko | + | — |
| *Apodemus* sp. | — | + |
| *Borsodia* sp. | + | — |
| *Dolomys ferui* n. sp. | + | + |
| *Mimomys minor* ssp. | + | + |
| *Mimomys* cf. *pliocaenicus* Major | + | + |

There seems to be a slight or no difference at all between the evolutionary stages of the two faunal levels at CM. The stratigraphic sequence in this locality was correlated with a neighbouring section, 18 m thick, which is equivalent to the succession above bed 19 at Slatina (Andreesco & al. 1981).

SLATINA-2 (code Sl-2)

The stratigraphic sequence at Slatina, over 40 m thick, contains several fossiliferous horizons with mammalian remains (Feru & al. 1978, 1979). Bed 14 (siltic clay) in this sequence, designated Slatina-1 (code Sl-1), yielded, among other rodents, a rich sample of *Dolomys milleri* Nehring. Bed 17, designated Slatina-2 (code Sl-2), consists of cross-bedded sands, up 2 m thick, including in their middle parts siltic lenses with plant remains, fresh-water molluscs and the following micromammals :

*Desmana nehringi* Schreuder
*Talpa fossilis* Petényi
*Beremendia fissidens* (Petényi)
Leporid cf. *Hypolagus brachygnathus* Kormos
*Apodemus* sp.
*Borsodia* sp.
*Dolomys ferui* n. sp.
*Mimomys minor* ssp.

In the cross-bedded sands remains of large mammals were recorded : *Mammuthus (Archidiskodon) gromovi* (Alexeeva & Garutt) and *Eucladoceros* sp. (Feru & al. 1978).

The palaeomagnetic data indicated the situation of bed 17 (Sl-2) in the Matuyama epoch prior to the Olduvai normal subchron (Andreesco & al. 1981). The mammalian association at CM is somewhat younger than that of Sl-2.

The molluscan association at Sl-2 and CM belongs to zone $NSM_{12}$ *Ebersininaia milcovensis-Rugunio riphaei*, subzone $NSM_{12d}$ *Bogatschevia tamanensis-Rugunio riphaei* (upper Romanian, Valahian substage) (Andreescu 1981, Andreesco & al. 1981).

## 3. CHRONOSTRATIGRAPHY

The Sl-1 fauna with *Dolomys milleri* (typical form) associated with a molluscan assemblage including *Unio kujalnicensis* (zone $NSM_{12}$, subzone $NSM_{12c}$) was considered to represent a cool time interval which may be equivalent to Tiglian B in the chronostratigraphy of the Netherlands (Zagwijn 1985). The subsequent mammalian faunas at Sl-2 and CM containing *Dolomys ferui* n. sp. seem to represent two successive phases corresponding to Tiglian C-3+4. Sl-2 might be correlative with Tiglian C-3 (warm-temperate), while CM seems to be equivalent to parts of Tiglian C-4 (shifting from temperate to cool). At any rate, the presence of *Mimomys* cf. *pliocaenicus* associated with *Allactaga* and *Borsodia* at CM suggests a climatic shift from warmer to cooler and drier (more continental) conditions.

The mammalian associations from Sl-1, Sl-2 and CM show affinities with similar Hungarian karst faunas (Villány mountains) to the north-west. The Romanian fossil localities may be situated in that time interval which is characterized by the coexistence of *Dolomys* and *Mimomys* forms (*Dolomys-Mimomys* zone) (Kretzoi 1956) (end of Villafranchian s. str./beginning of Villanyian) (Fejfar & Heinrich 1983, Kretzoi 1985).

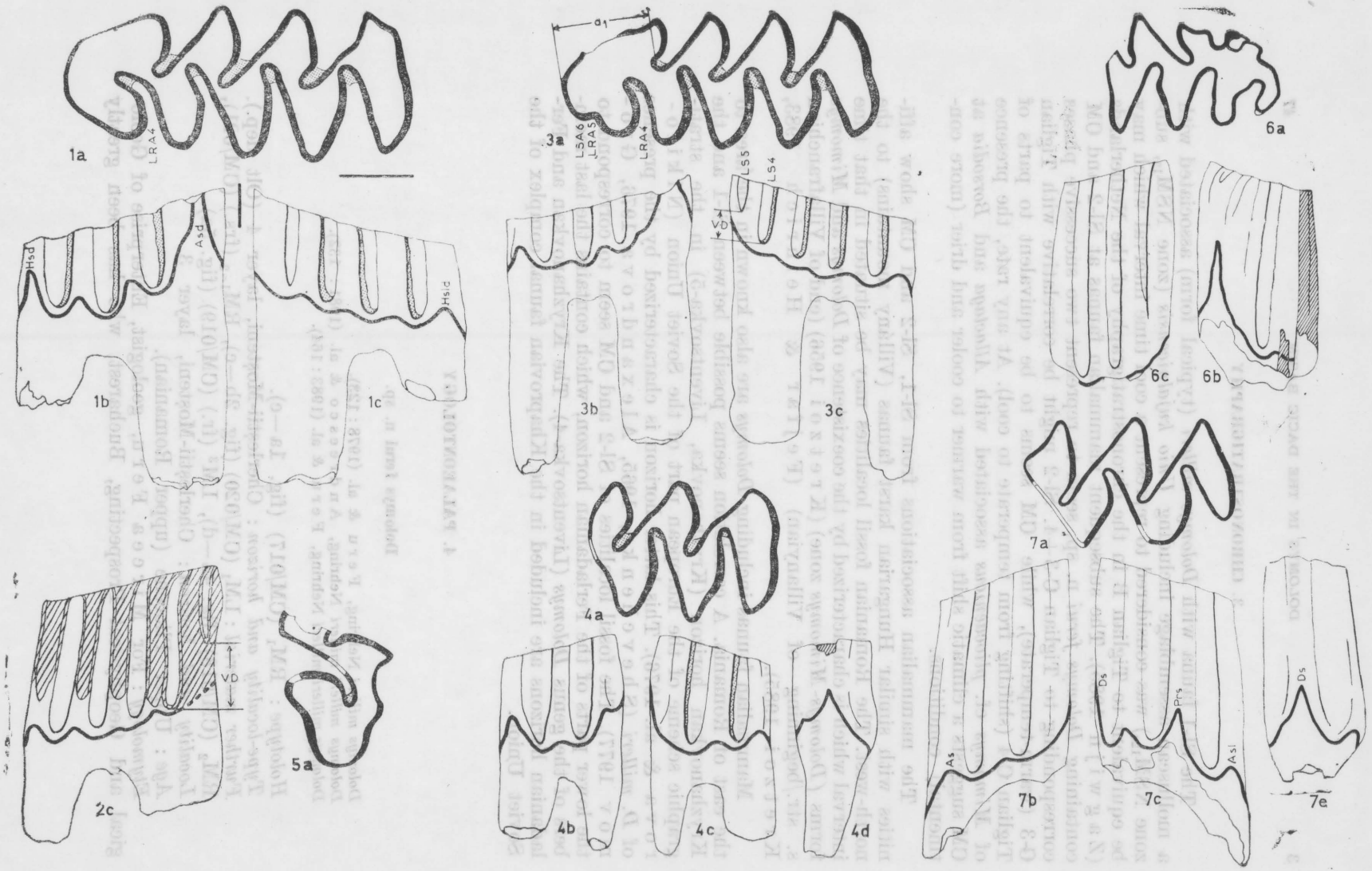
Mammalian faunas including *Dolomys* are also known in the area to the east of Romania. A correlation seems possible between Sl-1 and the Kryzhanovkan horizon (Kryzhanovka, Liventsovka-5) in the stratigraphic scheme of the European part of the Soviet Union (Nikiforova & al. 1976). This latter horizon is characterized by the presence of *D. milleri* (Shevchenko, 1965, Alexandrova 1976, Gromov 1977). The fossil localities of Sl-2 and CM seem to correspond to the lower parts of the Ferladanian horizon, which contains the last members of the genus *Dolomys* (Liventsovka-4). The Kryzhanovkan and Ferladanian horizons are included in the Khaprovian faunal complex of the Soviet Union.

## 4. PALAEONTOLOGY

### **Dolomys ferui** n. sp.

*Dolomys milleri* Nehring, Feru & al. (1978 : 123).
*Dolomys milleri milleri* Nehring, Andreescu & al. (1981 : 132).
*Dolomys milleri milleri* Nehring, Feru & al. (1983 : 164).

*Holotype* : $RM_1$ (CM/017) (fig. 1a—c).
*Type-locality and horizon* : Cherleştii-Moşteni, layer 4 (Olt dep.).
*Further material* : $LM_1$ (CM/020) (fig. 2b—c), $RM_{1-2}$ (frs.) (CM/021), $RM_2$ (CM/018) (fig. 4a—d), $LM^3$ (fr.) (CM/019) (fig. 5a).
*Locality and horizon* : Cherleştii-Moşteni, layer 3.
*Age* : Upper Pliocene (upper Romanian).
*Etymology* : For Mircea Feru, geologist, Enterprise of Geological and Geophysical Prospecting, Bucharest, who has been greatly


1a
LRA4
1b
Hsd
Asd
1c
Hsid
2c
VD
5a
3a
a1
LSA6
LRA5
LRA4
3b
LS5
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interested in the promotion of research on mammalian faunas in the Slatina area.

*Diagnosis* : A progressive *Dolomys* form distinguished by a larger size and higher dentine tracts on the molars. $M_1$ with anterior cap broad and shortened; LRA4 well developed, strongly curved at apex; LS5 less developed vertically (figs. 1a—c). Alternating triangles more closed (figs. 1a, 4a).

*Differential diagnosis* : *D. ferui* n. sp. differs from *D. milleri* in being of larger size and in having more closed dentine fields and higher dentine tracts (tables 1—3). $M_1$ of *D. ferui* n. sp. is characterized by the reduction of LS5 which disappears in the basal third of the crown (figs. 1c, 2c). In *D. milleri* LS5 is more developed attaining nearly the base of the crown (fig. 3c).

*Referred material* : $LM_1$ (fr.) (Sl-2/053) (figs. 6a—c), $RM^1$ (Sl-2/054) (figs. 7a—e).

*Locality and horizon* : Slatina-2, bed 17 (Olt dep.).

*Age* : Upper Pliocene (upper Romanian).

## DESCRIPTION

Cherleștii-Moșteni

$M_1$ — The type-specimen consists of a posterior loop, five triangles and an anterior loop; LRA4 is well developed and strongly curved forward; LRA5 is already absent at this stage of wear; the anterior cap is broad and short. The dentine tracts are relatively low, except for the anterior one which is higher establishing an interrupted enamel pattern on the occlusal surface. Enamel relatively thick, differentiated (thicker on the distal side of the dental prisms). A small quantity of cement is present in the reentrant angles (figs. 1a—c).

A younger specimen (CM/020), with lateral erosions, shows that LRA5 is present. In lingual view, LS5 is less developed vertically than LS4 (fig. 2c) (table 1).

$M_2$ — The tooth consists of a posterior loop and four triangles. In occlusal view, the buccal reentrants are more developed as compared with *D. milleri* from Sl—1 contributing to a more marked closure of the alternating triangles. The dentine tracts are higher on the postero-external dental prism (hyposinuid) and on the mesial wall (anterosinuid) of the crown (figs. 4a—d). The molar has two roots; the anterior root is slender, slightly compressed antero-posteriorly; the posterior one is broad and it was situated on the dorsal side of the incisor (acrorhiza-type). Comparative measurements are indicated in table 2.

$M^3$ — A fragment of a last molar, in an advanced stage of wear, shows the typical *Dolomys* pattern of the posterior loop (fig. 5a).

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**Dolomys ferui** n.sp. : fig. 1 — $RM_1$ (CM/017) type; fig. 2. — $LM_1$ (CM/020); fig. 4 — $RM_2$ (CM/018); fig. 5 — $LM^3$ (CM/019) fr.; fig. 6 — $LM_1$ (Sl-2/053) fr.; fig. 7 — $RM^1$ (Sl-2/054). *Dolomys milleri* : fig. 3 — $RM_1$ (Sl-1/010). a—e = occlusal, buccal, lingual, mesial and distal views. Asd = Anterosinuid, Hsd = Hyposinuid, Hsld = Hyposinulid, Prs = Protosinus, As = Anterosinus, Asl = Anterosinulus, Ds = Distosinus; for $a_1$ and VD see table 1. Scales equal 1 mm.

*Table 1*

Comparative measurements of $M_1$ of *Dolomys*

| | *D. ferui* n.sp. | | | | | *D. milleri* | | |
|---|---|---|---|---|---|---|---|---|
| | CM/017 type | CM/020 | Sl-2/053 | N | O.R. | Slatina-1 $\bar{X}$ | s | V |
| L | 4.60 | — | — | 8 | 3.60—4.10 | 3.935 | 0.2170 | 5.51 |
| W | 1.95 | — | 1.90 | 7 | 1.40—1.80 | 1.643 | 0.1484 | 9.03 |
| a | 2.15 | — | 2.00 | 7 | 1.95—2.15 | 2.041 | 0.0659 | 3.23 |
| $a_1$ | 1.20 | — | 1.20 | 7 | 1.20—1.40 | 1.293 | 0.0673 | 5.20 |
| A/L | 46.74 | — | — | 7 | 47.90—54.17 | 52.001 | 2.1185 | 4.07 |
| $a_1$/L | 26.09 | — | — | 7 | 29.20—36.49 | 32.981 | 2.7152 | 8.23 |
| $H_1$ | 1.75 | 3.10 | — | 6 | 1.35—4.25 | 3.100 | 1.0611 | 34.23 |
| VD | +2.00 | 1.50 | 1.25 | 12 | 0.40—1.15 | 0.808 | 0.2485 | 30.74 |
| Anterosinuid | — | — | 2.45 | 5 | 1.50—2.20 | 1.800 | 0.2525 | 14.03 |
| Hyposinuid | 1.15 | — | — | 7 | 0.60—0.80 | 0.678 | 0.0636 | 9.38 |
| Hyposinulid | 0.55 | 0.35 | — | 7 | 0.15—0.30 | 0.247 | 0.0553 | 22.37 |
| HI1 | 1.45 | — | — | 7 | 0.60—1.05 | 0.807 | 0.1450 | 18.04 |
| HI2 | 0.60 | — | — | 7 | 0.15—0.40 | 0.257 | 0.0838 | 32.61 |
| HI3 | 0.70 | — | — | 7 | 0.20—0.45 | 0.257 | 0.0886 | 34.47 |
| HI5 | — | — | 2.45 | 5 | 1.70—2.20 | 1.840 | 0.2043 | 11.10 |

W = width between LSA2—LSA3 and BSA2; $a_1$ = length of AC2 (see fig. 3a); $H_1$ = distal height parallel to the distal enamel wall of the crown (see Radulesco & Samson 1983, fig. 1.4); VD = vertical distance between the basis of LS4 and LS5 (see figs. 2c—3c); HI1—HI5 after Chaline & Laurin (1986, fig. 2).

*Table 2*

Comparative measurements of $M_2$ of *Dolomys*

| | *D. ferui* n. sp. CM/018 | N | O.R. | *D. milleri* Slatina-1 $\bar{X}$ | s | V |
|---|---|---|---|---|---|---|
| L | 2.60 | 10 | 2.00—2.40 | 2.259 | 0.1364 | 6.04 |
| W | 1.90 | 9 | 1.40—1.80 | 1.667 | 0.1308 | 7.84 |
| $H_1$ | 1.90 | 9 | 1.30—2.95 | 2.211 | 0.7339 | 33.19 |
| Anterosinuid | 1.15 | 9 | 0.60—0.98 | 0.778 | 0.1637 | 21.04 |
| Hyposinuid | 0.80 | 9 | 0.30—0.60 | 0.439 | 0.1041 | 23.72 |
| Hyposinulid | 0.45 | 9 | 0.45—0.55 | 0.489 | 0.0417 | 8.52 |

*Table 3*

Comparative measurements of $M^1$ of *Dolomys*

| | *D. ferui* n. sp. Sl-2/054 | N | O.R. | *D. milleri* Slatina-1 $\bar{X}$ | s | V |
|---|---|---|---|---|---|---|
| L | 3.00 | 6 | 2.70—3.10 | 2.958 | 0.1429 | 4.83 |
| W | 1.75 | 6 | 1.60—1.95 | 1.842 | 0.1393 | 7.57 |
| $H_1$ | 4.00 | 6 | 3.45—3.70 | 3.467 | 0.4854 | 14.00 |
| Protosinus | 1.45 | 6 | 0.80—1.35 | 1.133 | 0.1838 | 16.19 |
| Anterosinus | 0.25 | 6 | 0.25—0.45 | 0.353 | 0.0712 | 20.14 |
| Anterosinulus | 0.30 | 6 | 0.10—0.25 | 0.183 | 0.0606 | 33.03 |
| Distosinus | 1.14 | 6 | 0.65—0.90 | 0.833 | 0.1438 | 17.25 |

Slatina-2

$M_1$ — The specimen, a juvenile tooth, shows the higher anterosinuid characteristic of *D. ferui* n. sp. LRA5 is present with a less vertical development (table 1). In this stage of wear some supplimentary folds are present on the occlusal surface (figs. 6a—c).

$M^1$ — The molar is distinguished by higher dentine tracts (protosinus, distosinus) (figs. 7a—e) as compared with *D. milleri* from Sl—1 (table 3).

## DISCUSSION

In two previous papers (Andreescо & al. 1981, Feru &al. 1983) the *Dolomys* form at Sl-2 and CM was considered as belonging to the nominate subspecies *D. milleri milleri*. This identification was based on the assumption that in the lectotype of *D. milleri* (Mehély 1914, Hinton 1926) "*the sixth inner angle is obsolete*" (Hinton 1926 : 342). The new figures published by Rabeder (1981 : 182, figs. 1a—b) show, however, that the lectotype is not deprived of the sixth inner angle (LSA6) and that LRA5 is still present, although the stage of wear is very advanced.

A close comparison of the lectotype ($M_1$) and paralectotype ($M^{1-3}$) of *D. milleri* from Beremend (Rabeder 1981) with the corresponding molars from Sl-1 shows a very similar pattern of the occlusal surface and the same development of the dentine tracts. $M_1$ of both forms has a well developed LS5 which attains nearly the base of the crown (figs. 3a—c).

The genus *Dolomys* is known from five localities in the Dacic Basin, as follows :

**Dolomys nehringi** Kretzoi
Locality: Podari (code Pd) (Jiu valley, Dolj dep.).
Age: Gauss chron, late upper subchron.

**Dolomys milleri** Nehring
Locality: Milcovu din Vale (code MV) (Olt valley, Olt dep.).
Age: Gauss/Matuyama transition (?).
Locality: Slatina-1 (Olt valley).
Age: Lower Matuyama subchron.

**Dolomys ferui** n. sp.
Locality: Slatina-2 (Olt valley).
Age: Late lower Matuyama subchron (prior to the normal Olduvai subchron).
Locality: Cherleștii-Moșteni (Olt valley).
Age: Somewhat younger than Sl-2 (from the rodent evidence).

The Sl-1 and Sl-2 faunas are in superposed sediments. The specimens at Sl-2 are transitional from *D. milleri* to *D. ferui* n. sp. but closer to the latter.

*Dolomys* very probably disappeared in the Dacic Basin at the end of the Pliocene times. In the rich mammalian microfauna at Drăgănești-Olt (Olt valley) situated as early as the beginning of the Pleistocene (Eburonian stage), *Dolomys* is absent (Feru & al. 1979, 1983; Radulesco & Samson 1983).

A study of *Dolomys* samples from successive stratigraphic fossiliferous horizons in the Dacic Basin shows that there was a change in the height of the dentine tracts and in the occlusal pattern of $M_1$. The earliest form, *D. nehringi* from Pd, is of smaller size and has lower dentine tracts. It is believed that *D. nehringi* gave rise to *D. milleri* from MV and Sl-1. In comparison to the form at Pd, *D. milleri* is larger and possesses molars with higher dentine tracts. The youngest member of the genus, *D. ferui* n. sp. from CM is the largest and it presents more evolved dental characters; the specimens at Sl-2 seem to represent an incipient form of *D. ferui* n. sp.

At the present time, *Dolomys* is known from central (Hungary, Austria), eastern (southern Ukraine, Moldavian SSR) and south-eastern Europe (Romania). The genus seems to be absent from Poland. The specimens described as *D. nehringi* at Weze (Sulimski 1964) might belong to *Pliomys hungaricus* (see also Rabeder 1981 : 312). *Dolomys* was also mentioned in Spain at Gorafe-2 and Layna (*D. nehringi* in Montenat & de Bruijn 1976 or *Dolomys* sp. in van de Weerd & Daams 1979).

*Dolomys* preferred aquatic biotopes under warm temperate conditions. The climatic shift from warmer to cooler (and drier) at the end of the Pliocene times determined very probably the extinction of this genus in the Dacic Basin.

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