Acta zool. cracov., **39**(1): 223-228, Kraków, 15 Aug., 1996

Fossil voles (Rodentia, Arvicolidae) from south Transural

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Accepted for publication: 15 Sep., 1995

IVAKINA N., MALEEVA A., YELKIN Yu. 1996. Fossil voles (Rodentia, Arvicolidae) from south Transural. Acta zool. cracov., **39**(1): 223-228.

Abstract: New data on fossil voles from the south Transural region are presented. One species of *Villanyia* KRETZOI, 1956, one species of *Promimomys* KRETZOI, 1955, and four species of *Mimomys* F. MAJOR, 1902, were identified from the Zverinogolovskoye site. Two other species of *Mimomys* were found in material from Baturino. Zverinogolovskoye is dated to the Late Pliocene and Baturino to the Eopleistocene.

Key words: Rodentia, Arvicolidae, Late Pliocene, Eopleistocene, South Transural.

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I. INTRODUCTION

Extinct voles have so far mainly been found in Europe, the European part of the former Soviet Union, Kazakhstan, and southwest Siberia. In this regard, the Transural region is poorly studied. The present study presents data on extinct voles of the genera *Villanyia* KRETZOI, 1956, *Promimomys* KRETZOI, 1955, and *Mimomys* F. MAJOR, 1902 from the Zveringolovskoye and Baturino sites in south Transural (Fig. 1).

A c k n o w l e d g m e n t s. The authors are grateful to many colleagues for the loan of material and also for advice and assistance, and wish to acknowledge help given by Professor I. M. GROMOV (Institute of Zoology, Russian Academy of Sciences, St-Petersburg), Dr A. K. AGADZHANIAN (Institute of Paleontology, Russian Academy of Sciences, Moscow), Dr A. V. BORODIN (Institute of Plant and Animal Ecology, the Urals Department of Russian Academy of Sciences, Ekaterinburg), Dr L. I. GALKINA (Institute of Biology, Siberian Department of Russian Academy of Sciences, Novosibirsk), Dr A. S. TESAKOV (Institute of Geology, Russian Academy of Sciences, Moscow), Dr L. A. TJUTKOVA (Institute of Zoology, Kazakhstan Academy of Sciences, Alma-Ata).

II. MATERIAL AND METHODS

Dental material from Zverinogolovskoye and Baturino (middle-upper layer, point 1) was analysed for 33 features of M_1 and 21 features of M^3. For comparison, fossil teeth of voles of the genera *Villanyia* (4 samples: M_1 n=50, M^3 n=13), *Promimomys* (2 samples: M_1 n=34, M^3 n=13), and *Mimomys* (6 samples: M_1 n=481, M^3 n=228) were used.

In parallel with traditional methods of investigation, we used multivariate canonical discriminant analysis (ANDERSON 1963) as well as invariate analysis to examine the degree of similarity of the samples. For analysis of the correlational structure of the measurement data, cluster analysis

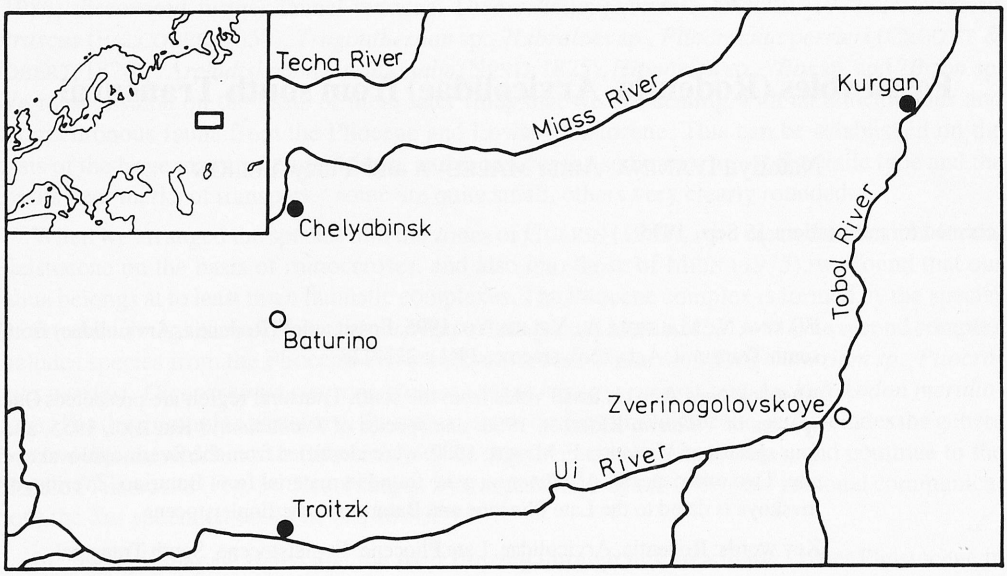

Fig. 1. Geographic position of localities Baturino and Zverinogolovskoye.

and principal components analysis were employed (DURAN & ODELL 1977; YELKIN & ISHCHENKO 1979; MALEEVA & YELKIN 1986).

III. RESULTS

Study of the material by traditional and multivariate morphometric methods allowed us to identify seven species of *Villanyia*, *Promimomys*, and *Mimomys* at Zverinogolovskoye, and two species of *Mimomys* at Baturino.

Zverinogolovskoye site

Genus *Villanyia* KRETZOI, 1956

Villanyia (*Villanyia*) *steklovi* ZAZHIGIN, 1980

Material: 3 isolated M_1 and 5 isolated M^3. (Fig. 2)

Description and comparison: M_1: occlusal length 2.50, 2.45, 2.55; occlusal width 1.15, 1.05, 1.10. M^3: occlusal length 1.80, 1.50, 1.75, 1.45, 1.80; occlusal width 0.85, 0.65, 0.75, 0.75, 0.80. There is no cementum in the re-entrant angles. The enamel is undifferentiated. In M_1 the height of the dentine tracks exceeds half the height of the crown. Two out of five M^3 have a posterior enamel islet. The molars from Zverinogolovskoye are similar to those from Beteke (western Siberia) (ZAZHIGIN 1980).

Genus *Promimomys* KRETZOI, 1955

Promimomys (*Cseria*) *gracilis* KRETZOI,1959

Material: 1 isolated M_1 and 1 isolated M^3. (Fig. 2)

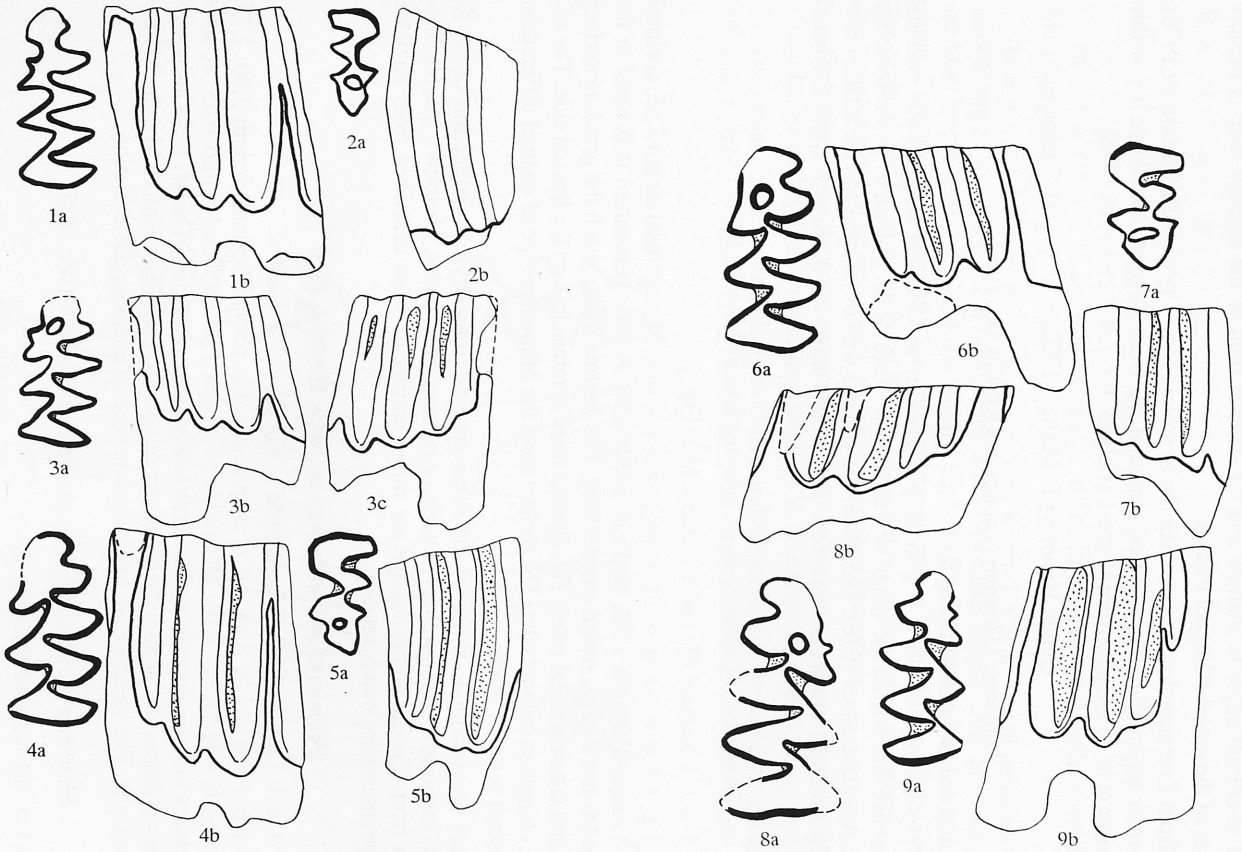

Fig. 2. Molars from Zverinogolovskoye. *Villanyia steklovi* ZAZHIGIN: 1: M_1 (2.45 × 1.05 × 3.20); 2: M^3 (1.50 × 0.65 × 2.70). *Promimomys gracilis* KRETZOI: 3: M_1 (2.15 × 1.05 × 2.25). *Mimomys* ex gr. *reidi* HINTON: 4: M_1 2.75 × 1.35 × 1.50); 5: M^3 (1.70 × 0.85 × 2.15). *Mimomys* ex gr. *pliocaenicus* F. MAJOR: 6: M_1 (2.85 × 1.35 × 2.25); 7: M^3 (1.80 × 0.90 × 1.70). *Mimomys polonicus* KOWALSKI: 8: M_1 (3.40 × 1.50 × 1.75). *Mimomys* ex gr. *intermedius* NEWTON: 9: M_1 (2.70 × 1.15 × 3.00). Explanations: a – occlusal surface; b – buccal side; c – lingual side. The dimensions given in brackets are occlusal length × occlusal width × height of the crown in mm.

D e s c r i p t i o n a n d c o m p a r i s o n: M_1: occlusal length 2.15; occlusal width 1.05. M^3: occlusal length 1.50; occlusal width 0.85. The enamel undifferentiated and the dentine tracks are low. The M_1 has an oval enamel islet and a *Mimomys* ridge. This tooth is not symmetric since the lingual re-entrants are deeper than the buccal ones. Cementum exists in limited amounts only in the lingual re-entrants. The dentine fields merge together broadly. In M^3 the anterior lingual re-entrant angle is shallow and the dentine field of the anterior loop is broadly connected to that of the anterior lingual triangle.

Specimens from Zverinogolovskoye are similar to molars from Uryv I (AGADZHANIAN 1976), although the former are smaller. The occlusal length of M_1 from Zverinogolovskoye lies within the range of variation of *P. gracilis* from Węże-1 (Poland) (cf. AGADZHANIAN 1976).

Genus *Mimomys* F. MAJOR, 1902

Mimomys (*Mimomys*) *polonicus* KOWALSKI, 1960

M a t e r i a l: 1 isolated M_1. (Fig. 2)

D e s c r i p t i o n a n d c o m p a r i s o n: Occlusal length 3.40; occlusal width 1.50. The size lies within the range of variation of teeth of *M. polonicus* from Rębielice Królewskie (cf. AGADZHANIAN 1976). The *Mimomys* ridge is well developed and the enamel islet persists virtually until the crown is worn out. The molars have the *Mimomys* type of enamel differentiation.

Mimomys (*Mimomys*) ex gr. *pliocaenicus* F. MAJOR, 1902

M a t e r i a l: 1 isolated M_1 and 1 isolated M^3. (Fig. 2)

D e s c r i p t i o n a n d c o m p a r i s o n: M_1: occlusal length 2.85; occlusal width 1.35. M^3: occlusal length 1.80; occlusal width 0.90. A little cementum is present in the re-entrants. The M_1 has a large, round enamel islet. The dentine tracks reach the grinding surface from the labial and anteroconidal sides. The dentine track is rather low on the lingual side. The M^3 has a posterior, elongated enamel islet. The molars have the *Mimomys* type of enamel differentiation and the enamel is rather thick.

These molars are similar to those of the same species from Uryv II (collection of A. K. AGADZHANIAN (Institute of Paleontology, Russian Academy of Sciences, Moscow). Morphologically, the teeth from Zverinogolonovskoye are rather similar to those described from Kizikha, although our specimens are much smaller.

Mimomys (*Mimomys*) ex gr. *reidi* HINTON, 1910

M a t e r i a l: 3 isolated M_1, 1 isolated M^3. (Fig. 2)

D e s c r i p t i o n a n d c o m p a r i s o n: M_1: occlusal length 2.80, 2.75, 2.50; occlusal width 1.15, 1.35, 1.10. M^3: occlusal length 1.70; occlusal width 0.85. A little cementum is present in the re-entrants and the dentine tracks are rather low. The M_1 lacks an enamel islet and *Mimomys* ridge. The dentine fields of the prisms are confluent. Unlike M_1, the M^3 has posterior enamel islet. The molars have the *Mimomys* type of enamel differentiation.

Mimomys (*Cromeromys*) ex gr. *intermedius* NEWTON, 1881

M a t e r i a l: 1 isolated M_1. (Fig. 2)

D e s c r i p t i o n a n d c o m p a r i s o n: Occlusal length 2.70; occlusal width 1.15. The re-entrants are filled with cementum for half of their depth. The *Mimomys* ridge well developed, persisting until the crown is worn halfway down. The enamel differentiation is of the *Mimomys* type. The dentine tracks reach the occlusal surface at the anteroconid and from the labial side of crown. The lingual side track is of medium height.

The molar from Zverinogolovskoye is similar to those described by V. S. ZAZHIGIN (1980) from Beteke, but the specimen from Zverinogolovskoye is smaller.

Apart from the voles, the following species of small mammals have been found at Zverinogolovskoye: *Pliolagus* sp., *Ochotona antiqua* PIDOPLITSHKA, 1938, *Ochotona pseudopusilla* GUREEV & SCHEVTSCHENKO, 1964, *Citellus* sp., *Marmota* sp., *Sicista* sp., and *Plioscirtopoda* sp.

B a t u r i n o s i t e

Mimomys (*Cromeromys*) *intermedius* NEWTON, 1881

M a t e r i a l: 11 isolated M_1 and 2 isolated M^3 from the middle-lower layer. 1 isolated M1 from point 1. (Fig. 3, Table I).

D e s c r i p t i o n a n d c o m p a r i s o n: For dimensions of M_1 from the middle-upper layer, see Table I. M_1 from point 1: occlusal length 2.60; occlusal width 1.20. M^3: occlusal length 1.70, 1.95; occlusal width 0.95, 0.90. The M_1 lacks an enamel islet and *Mimomys* ridge. Cementum occupies half the depth of the re-entrant. The dentine tracks are high and reach the occlusal surface in all teeth. In M^3 the second inner fold persists as a normal fold throughout the crown instead of being subject to reduction by islet formation.

The molars from Baturino are similar to those of the same species from sites in western Siberia (Kizikha, Razdolje, Makhanovo) described by V. S. ZAZHIGIN (1980).

The molars of *M. intermedius* are almost indistinguishable from those of adult specimens of *Mimomys pusillus* MÉHELY, 1914 (there is an enamel islet in juvenile teeth of *M. pusillus*)

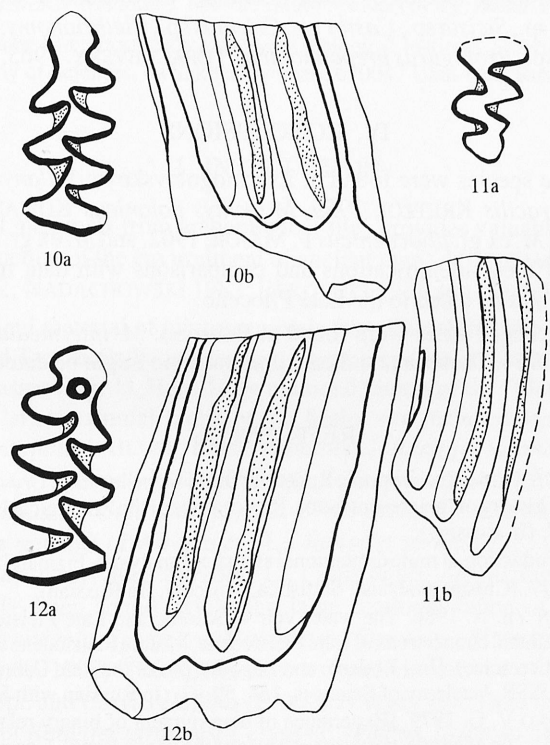

Fig. 3. Molars from Baturino. *Mimomys intermedius* NEWTON: 10: M_1 from middle-upper layer (2.95 × 1.20 × 3.15); 11: M^3 from middle-upper layer (1.70 × 0.95 × 3.25). *Mimomys pusillus* MÉHELY: 12: M_1 from point 1 (3.15 × 1.40 × 4.50). For explanations see Fig. 2.

Table I

Dimensions (range and mean, mm) of molars from Baturino

M_1	*M. intermedius*			*M. pusillus*		
	N	Mean	Range	N	Mean	Range
Occlusal length	11	2.88	2.65-3.20	6	2.90	2.75-3.15
Occlusal width	11	1.27	1.15-1.40	6	1.30	1.20-1.55
Height of crown	11	2.80	0.85-4.10	6	4.50	3.75-5.40

(ZAZHIGIN 1980). All M_1 have here been assigned to the species *M. intermedius* as all M^3 found in the middle-lower layer were identical to M^3 of that species.

Mimomys (*Microtomys*) ex gr. *pusillus* MÉHELY, 1914

Material: 6 isolated M_1 from point 1. (Fig. 3, Table I)

Description and comparison: For dimensions of M_1, see Table I. The M_1 lacks a *Mimomys* ridge. An enamel islet present only in juvenile molars. There is less cementum present than in *M. intermedius*. The dentine tracks are high, in some cases not reaching the occlusal surface in juvenile molars.

The molars from Baturino are similar to those of the same species from sites in western Siberia (Razdolje, Vyatkino, Kalmanka) described by ZAZHIGIN (1980). The molar of *M. pusillus* found at Point 1 differs from those of *M. intermedius* from the upper-lower layer in its higher crown (see Table I) and wider connection of dentine fields of triangles.

The following additional species of small mammals were found at Baturino: *Desmana* sp., *Ochotona* sp., *Citellus* sp., *Sicista* sp., *Castor* sp., *Cricetus* sp., *Clethrionomys* ex gr. *rutilus* PALLAS, 1779, *Clethrionomys* sp., *Prolagurus prepannonicus* TOPACHEVSKY, 1965, and *Allophaiomys* sp.

IV. CONCLUSIONS

The following vole species were found at Zverinogolovskoye: *Villanyia steklovi* ZAZHIGIN, 1980, *Promimomys gracilis* KRETZOI, 1959, *Mimomys polonicus* KOWALSKI, 1960, *M.* ex gr. *hintoni* FEJFAR, 1961, *M.* ex gr. *pliocaenicus* F. MAJOR, 1902, and *M.* ex gr. *intermedius* NEWTON, 1881. On the basis of these identifications and comparisons with data from the the literature, Zverinogolovskoye might be dated to the Late Pliocene.

The following species of voles were found at Baturino: *M. intermedius* NEWTON, 1881 and *M. pusillus* MEHELY, 1914. These taxa indicate that Baturino might be dated to the Eopleistocene.

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