

Herpetofauna from the Pleistocene (Cromerian) locality Kholki (Belgorod region, Russia)

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ABSTRACT

The following taxa have been recognized in the Lower Cromerian deposits of the Kholki locality: *Pelobates fuscus*, *Bufo bufo*, *B. raddei*, *Rana* sp., *Novooskolia cristata*, *Lacerta* sp. and *Natrix* sp.. This amphibian and reptile assemblage indicates a forest-steppe situation.

SAMENVATTING

In de vindplaats Kholki (Rusland) uit het Onder Cromerien zijn de volgende amfibieën en reptielen gevonden: *Pelobates fuscus*, *Bufo bufo*, *B. raddei*, *Rana* sp., *Novooskolia cristata*, *Lacerta* sp. and *Natrix* sp.. De fauna duidt op een omgeving met zowel bos als steppen.

Introduction

Fossil amphibian and reptiles remains occur with small mammals in many fossil localities. These ectothermic animals are very sensitive to environmental conditions. Therefore amphibian and reptile remains may help to reconstruct the situation in which the site was formed (RATNIKOV, 1995). This is especially important regarding the territory of Russian Platform, which was covered with ice repeatedly during antropogene times when the climatic and topographic situation was changing. Forms which live now in other areas may help us to define the geological age of the deposits.

The Kholki locality is situated on the western outskirts of the village of Kholki 85 km E-N-E of Belgorod, in the wall of a chalk quarry (Fig. 1). The small vertebrate fauna was discovered by G.Cholmovoi and B.Glushkov in 1983 during geological mapping. The fossil bones came from the basal sands; the small mammal association studied by Dr. A. Agadjanian correlates to the first half of the Cromerian Complex.

The small collection of amphibian and reptile remains was collected by the author and screen-washed in 1985. Most of remains are those of anurans with lesser numbers of lizards and snakes. All of the material resides in the Geological faculty of Voronezh State University.

Systematic Paleontology

Class Amphibia
Order Anura
Family Pelobatidae

Pelobatus fuscus (LAURENTI, 1768)

Material: Otoccipital No 519/16; sphenethmoid No 519/6; frontoparietal No 519/5; presacral vertebra No 519/7. (Fig. 2A).

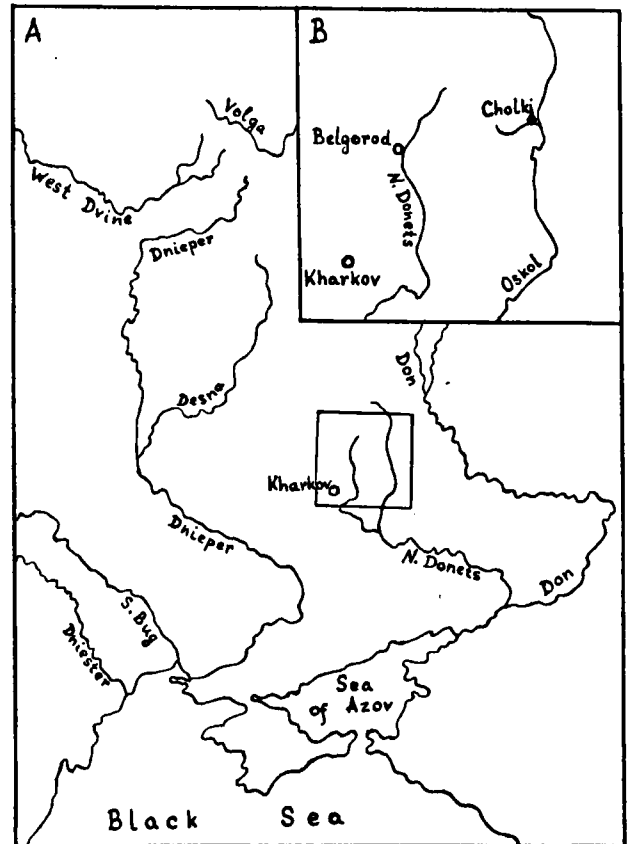


Fig. 1: Geographic position of the Kholki locality.

Fig. 1: Geografische positie van de Kholki vindplaats.

Remarks: It is difficult to distinguish the widespread European species *Pelobates fuscus* from *P. syriacus*, especially if the bones are incomplete. The most diagnostic bone in the material is the frontoparietal. It shows general outline and form of *P. fuscus* (ROCEK, 1980). Other bones differ from those of *P. syriacus* in details only.

Pelobates sp. indet.

Material: Otoccipital No 519/17; maxillary No 519/18; 5 vertebrae No 519/8-12; tibiofibula No 519/22; 2 fibulae No 519/24,25.

Remarks: The material consists of small fragments. Generic identification is not difficult as the bones are characteristic *Pelobates* in form and sculpturing of the maxillary and other characters. They cannot, however, be identified at the specific level (RATNIKOV, 1994).

Family Bufonidae

Bufo bufo (LINNAEUS, 1758)

Material: Ilium No 519/4. (Fig. 2B).

Remarks: The bone represents a large toad, about 115 mm in length (Fig. 2,a). The lack of a preacetabular pit and the thickness of ala ossis ilii indicate the *Bufo bufo* complex. The low and long Tuber superior is diagnostic of *Bufo bufo* (RATNIKOV, 1994).

Bufo bufo complex

Material: Parasphenoid No 519/15. (Fig. 2C).

Remarks: The *Bufo bufo* complex is in Russia represented by three species *Bufo bufo*, *B. verrucosissimus* and *B. gargarizans*. The *Bufo viridis* (green toad) complex contains four Russian species: *B. viridis*, *B. raddei*, *B. calamita* and *B. danatensis*. The two groups differ both in morphology and ecology. Grey toads are inhabitants of closed (forests and bushes) biotopes, while green toads live in open (steppe) biotopes. The curvature of the parasphenoid body at the level of the lateral processes and the contrasting relief of the ventral surface indicate that the specimen belongs to the first complex (Fig. 2,b). It was a large animal with a body length of about 110 mm. As the bone does not directly correspond with any of the grey toad group it may belong an extinct or exotic species. Unfortunately, the anterior part of the bone is not preserved.

Bufo raddei Strauch, 1876

Material: Scapula No 519/13. (Fig. 2D).

Remarks: This specimen differs from other Russian toads in being longer and having a narrow neck region (Fig. 2, c). Modern scapulae of *Bufo raddei* from Primorie in the Russian Far East are more massive and have a wider scapular column than scapulae from Mongolia. Number 519/13 is Mongolian-like.

Bufo sp. indet.

Material: Humerus No 519/14.

Remarks: This specimen is similar to *B. viridis* in the form of the medial crest, but differs from it by the thicker and more highly developed lateral crest. This bone may belong to a species that is presently unknown in Russia.

Family Ranidae

Rana sp. indet.

Material: 3 tibiofibulae No 519/19-21.

Remarks: Tibiofibulae of true frogs are long and thin; their width gradually increases towards the epiphyses and the middle part of the bone is round in cross-section. These characters distinguish tibiofibulae of *Rana* from those of toads and pelobatids.

Familia incerta

Novooskolia cristata Ratnikov, 1993

Material: 2 ilii No 519/1, 2. (Fig. 2E, 2F).

Remarks: The first description of this form, based on the material mentioned above, has been published before (Ratnikov, 1993). The morphology of the ilium differs from that of all the members of any extant anuran families in Russia. The typical characters of the ilium are the presence of a dorsal crest ascending vertically from ala ossis ilii, a weak tuber superior, a wide acetabulum, and the absence of or a weakly developed pars descendens ilii (Fig. 2,d,e).

Novooskolia sp. indet.

Material: Fragment of ala ossis ilii No 519/3.

Remarks: The bone demonstrates a vertically rising dorsal crest, that is one of characteristic peculiarities of this genus.

Anura fam. et gen. indet.

Material: radioulna No 519/23, 2 hollow limb bones No 519/26,27.

Remarks: These bones lack diagnostic features and cannot assigned to family or genus.

Class Reptilia

Order Sauria

Family Lacertidae

Lacerta sp. indet.

Material: 3 vertebral centra No 519/28-30, 4 fragments of neural arches No 519/31-34, fragment of a toothed os dentale No 519/35.

Remarks: Tricuspid dentary teeth and the shape of vertebral centra indicate that the remains belong to the genus *Lacerta*. The bones resemble the extant local *L. agilis*. However, poor preservation of the material does not allow assignment to the specific level.

Order Serpentes
Natrix sp. indet.

Material: trunk vertebra No 519/36. (Fig. 2G).

Remarks: Presence of hypapophyses and subcentral ridges are typical of the genus *Natrix*. Specific identification is hampered by the poor preservation of the specimen. However, the bone is very similar to *N. tessellata*, but it has a more rounded neural arch over the postzygapophysis. The epizygapo-physeal spine is almost imperceptible. The prezygapophyseal process is short and relatively narrow unlike those in all of the three modern European species (*Natrix natrix*, *N. tessellata* and *N. maura*) (SZYNDLAR, 1984).

Serpentes fam. indet.

Material: Fragment of neural arch No 519/37.

Remarks: This fragment lacks diagnostic parts.

Comments

The Kholki locality has yielded the following herpetological taxa: *Pelobates fuscus* (Laurenti) - 4, *Pelobates* sp. - 10, *Bufo bufo* (Linnaeus) - 1, *Bufo bufo* complex - 1, *Bufo raddei* Strauch - 1, *Bufo* sp. - 1, *Rana* sp. - 3, *Novooskolia cristata* Ratnikov - 2, *Novooskolia* sp. - 1, Anura fam. indet. - 3, *Lacerta* sp. - 8, *Natrix* sp. - 1 and Serpentes fam. indet. - 1.

The fauna has interesting features:

1. The fauna contains *Bufo raddei*, a modern form that has only recently been discovered in the extant herpetofauna of Europe. The species now inhabits Mongolia, Primorie and Transbaikalia and a new locality in eastern Russia that will be published elsewhere.

2. The fauna contains a number of extinct species (p.e. *Novooskolia cristata*). The systematic position of forms as *Bufo bufo* complex, *Bufo* sp., *Natrix* sp. is not clear yet. They may well belong to extinct forms or to forms that do not live in Russia at present.

3. Remains of grey toads indicate animals of large dimensions reaching 110 - 115 mm in length. Mean length of living forms from Russian Plain reaches 80-85 mm (BANNIKOV *et al.*, 1977). This is possibly an indication of more favorable climatic conditions (warmer and more humid) that occurred in the Pleistocene.

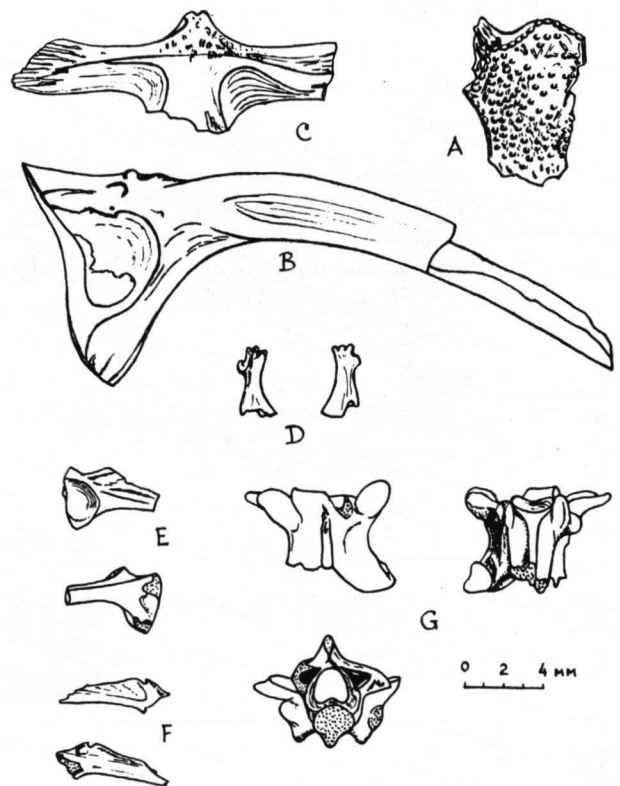


Fig. 2: Fossil bones of amphibians and reptiles of Kholki locality:

A - frontoparietal of *Pelobates fuscus* No 519/5, dorsal view;
B - ilium of *Bufo bufo* No 519/4, lateral view;
C - parasphenoid of *Bufo bufo* complex No 519/15, ventral view;
D - scapula of *Bufo raddei* No 519/13, outer and inner views;
E, F - ilia of *Novooskolia cristata* No 519/1, 2, lateral and medial views;
G - trunk vertebra of *Natrix* sp. No 519/36, dorsal, ventral and posterior views.

Fig. 2: Fossiele beenderen van amfibieën en reptielen van de Kholki vindplaats:

A - frontoparietale van *Pelobates fuscus* No 519/5, dorsaal aanzicht;
B - ilium van *Bufo bufo* No 519/4, lateraal aanzicht;
C - parasphenoideum van *Bufo bufo* complex No 519/15, ventraal aanzicht;
D - scapula van *Bufo bufo* No 519/13, intern en extern aanzicht;
E, F - ilia van *Novooskolia cristata* No 519/1, 2, lateraal en mediaal aanzicht;
G - thoracale wervel van *Natrix* sp. No 519/36, dorsaal, ventraal en posterieur aanzicht.

The amphibian assemblage described here contains both forest (*Bufo bufo*, *Bufo bufo* complex) and steppe (*B. raddei*) forms. Predominance of the forest forms indicates wide-spread wooded landscapes. At the same time high number of pelobatid and lacertid (close to *L. agilis*) remains indicates the presence of forest-steppe conditions. One can envision a landscape with forests along river valleys separated by steppe areas on watersheds. The herpetofaunal composition indicates warmer climatic conditions than exist today. This conclusion does not contradict the evidence based on the small mammal assemblages from the same locality.

Desmana cf. thermalis
Desmana sp.
Talpa ex gr. minor
Sorex sp.
Leporidae gen.
Ochotona sp.
Sciuridae gen.
Allactaga jaculus
Pygeretmys sp.
Apodemus ex gr. sylvaticus
Sicista sp.
Allocricetus sp.
Mimomys pusillus
Clethrionomys ex gr. glareolus
Pitymys hintoni
Microtus n. sp.
Microtus sp.
Microtinae gen. indet.
Lagurus transiens
Eolagurus simplicidens
Eolagurus sp.

Table 1: Faunal list of the smaller mammals of the Kholki locality
(det. Dr A. Agadjanian).

Tabel 1: De kleine zoogdieren van Kholki (det. Dr. A. Agadjanian).

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