

## Changes to the generic names of extinct East European species described as *Bufo belogoricus* Ratnikov, 1993, *Bufo planus* Ratnikov, 1993 and *Bufo albus* Ratnikov, 1993 (Amphibia, Anura, Bufonidae)

V. Yu. Ratnikov<sup>1</sup>

Recent systematic changes of living anuran amphibians frequently necessitate the revision of closely related fossil taxa. Martín *et al.* (2012) proposed nomenclatural changes for some extinct forms, including new combinations for two species of toads (Bufonidae) originally described by the present author (Ratnikov, 1993). These species, in the opinion of Martín *et al.* (2012), were originally associated (quoting Ratnikov, 2002) with the former *Bufo (viridis)* species group, and consequently they proposed its reassignment as *Pseudepidalea*, a genus then in use and currently a synonym of *Bufotes* (see Frost, 2013). I think this opinion is erroneous, and that the generic adscription to *Bufo* should be maintained until more information becomes available about these forms. Here, I first show that these species were not originally assigned to any *Bufo* species group, and then I comment on some morphological data that might clarify their generic adscriptions.

To begin with, the mistaken quotation of Ratnikov (2002) by Martín *et al.* (2012) is probably connected to a misunderstanding of the structure of this monograph. This monograph is written in Russian, and an inaccurate or partial translation likely distorted the meaning of the text.

The chapter about toads (2.5. Family Bufonidae Gray, 1825) has the following sections:

1. The diagnosis of family and composition.
2. A section with the heading “*Genus Bufo*”. The diagnosis of the genus and its specific composition is presented. Modern species of the former Union of Soviet Socialist Republics, or USSR, are grouped into two complexes: *Bufo (bufo)* or grey toads, and *Bufo (viridis)* or green toads.

The section ends with the statement: “*The remains of representatives of both complexes, and also of the extinct species B. albus Ratnikov, 1993, B. belogoricus Ratnikov, 1993 and B. planus Ratnikov, 1993, were found by us in Late Cenozoic deposits from the East European Plain*” (Ratnikov, 2002, p. 28).

3. A section with the heading “*Bufo (bufo) sp.*”. The diagnosis of the complex and its composition is presented. It includes three modern species from former USSR territory. The description of the fossil remains of the species in this complex is given under separate headings.
4. A section with the heading “*The remains of Bufo (bufo) sp., which are not clearly definable*”. A list of localities for the representative remains of this complex that do not allow specific assignment is presented.
5. A section with the heading “*Bufo (viridis) sp.*”. The diagnosis of the complex and its composition is presented. “*Five species of green toads currently live in the former USSR territory. The remains of three species are found in Late Cenozoic deposits from an East European plain: B. calamita Laurenti, 1768, B. raddei Strauch, 1876, and B. viridis Laurenti, 1768.*” (Ratnikov, 2002, p. 32). The description of the fossil remains of these three species is given under separate headings.
6. A section with heading “*The remains of Bufo (viridis) sp., which are not clearly definable*”. A list of localities for the representative remains of this complex that do not allow specific assignment is presented.

<sup>1</sup> Voronezh State University. University Square 1, Voronezh, Russia. vratnik@yandex.ru

7. The description of the remains of three extinct species is given under separate headings.

Thus, in the Ratnikov (2002) monograph, I have not associated the extinct species with the group of green toads, i.e. *Bufo (viridis)*. I have simply given their description following the description of the remains of the modern species. I regret that the structure of my monograph has been misunderstood by colleagues.

Do the bones of extinct forms have attributes that allow their association with any complex? Three extinct species of toads (Ratnikov, 1993) are described:

***Bufo belogoricus*** Ratnikov, 1993

I first described *Bufo belogoricus* (Ratnikov, 1993) based on a frontoparietal bone (VSU Voronezh 530/102) from the Upper Pliocene of Korotoyak-Belogor'e (Russia). Subsequently, another frontoparietal bone, a fragment of the parietal, maxillare and a humerus were found in the same locality. I have also assigned them to *Bufo belogoricus*. The description of the bones is presented below (translated from Russian):

“Frontoparietal bones [figs. 1A, B] massive, with poorly convex or flat rough dorsal surfaces covered by fine porosity; visible sculpture in the form of extended cylinders and grooves can be observed. The thickness of the bones increases towards the lateral inflection where it is up to 1 to 1.5 mm thick. The length of the largest fragment is 13.5 mm; the length of the holotype is 12.5 mm. The lateral edge of the horizontal bone plate hangs over the vertical plate in the form of a crest where the pars frontalis and pars parietalis are in contact. The width of the bone is maximal at this point of contact. The ventral surface of the bones is covered by original hatching, characteristic for toad bones. The facies cerebralis posterior has a large pointed laterally oval shape extending diagonally all the length of the bone. It is difficult to determine the exact outlines of the bones because of their damaged edges.

“The holotype description (Ratnikov, 1993) states that the frontoparietal of *B. belogoricus* differs from the corresponding bone of all other Russian toads by its thickness and the presence of a lateral edge that hangs over the vertical plate.

*Comparison of the second fossil frontoparietal with corresponding similar-sized bones of Bufo verrucosissimus (the length of individuals is between 95-112 mm) shows a similarity between these species. The latter have a weak sculpture in the form of poorly expressed tubercles and thin grooves; two comparative examples of the collection show a hanging lateral edge over the vertical plate, and a facies cerebralis posterior with similar structure. However, in B. belogoricus, the bone is thicker, the surface is noticeably rougher, the facies cerebralis posterior is wider and the overhanging lateral edge is more pronounced than in B. verrucosissimus, and it is not typical for the last”* (Ratnikov, 2002, p. 35-36). The similarity of the described fossil samples with respect to *B. verrucosissimus* supports their inclusion in *Bufo* instead of *Pseudepidalea*. However, the overhanging frontoparietal lateral edge is also observed in other toads, such as *Duttaphrynus melanostictus* (Schneider, 1799), *Amietophrynus regularis* (Reuss, 1833), and *Rhinella marina* (Linnaeus, 1758). Thus, strictly speaking, the fossil bones could also be assigned to other genera; however, these genera presently live in biogeographically distant regions.

“The maxilla belonged to a very large individual, more than 120 mm in snout-vent length [fig. 1C]. It is a large bone, 18 mm in length, with a broken posterior part; its height gradually increasing posteriorly up to 5.4 mm. The lateral surface is rough, lumpy, and covered by fine porosity and original hatching, characteristic for toad bones. The anterior margin of the pars facialis is rounded and weakly projects toward the rounded anterior margin of the pars dentalis. The posterior end of the pars palatina is not preserved, but it is clear that it was well developed and projected above the pars facialis. The palatal (ascending) process is broken at a level of the dorsal margin of the pars facialis. It is connected to the pars palatina by a plate that runs along the process from its internal side. This plate steeply extends to the level of the medial margin of the pars palatina, ultimately joining it. In contrast, fusion of the internal plate with the pars palatina, in all of the other toads in my comparative collection, occurs near its base. Another difference is the morphology of the anterior end of the bone” (Ratnikov, 2002, p. 37). In the context of the topic considered here, the anterior end of the bone indicates that it possibly belongs to the genus *Bufo*

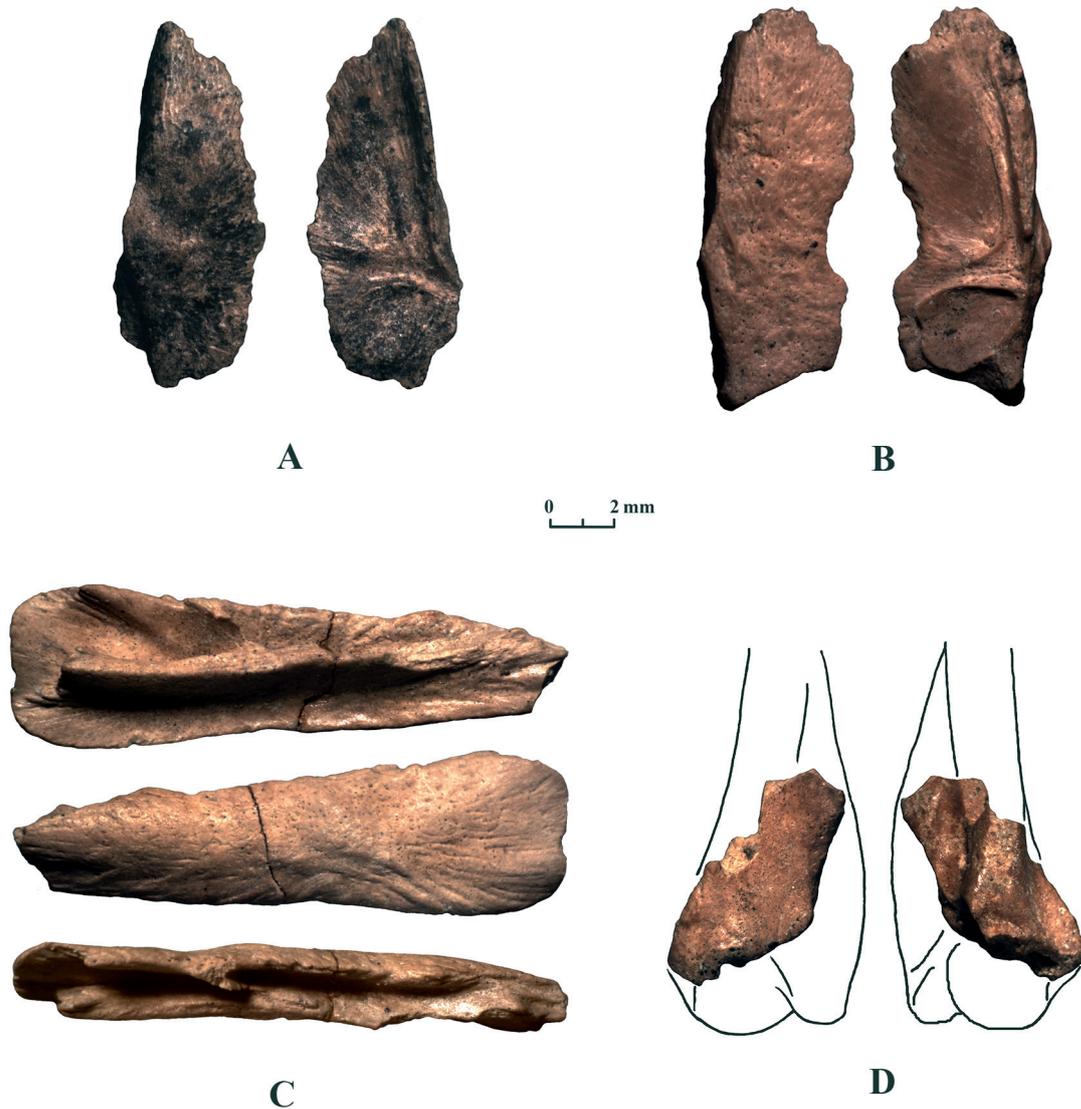


Fig. 1.— *Bufo belogoricus* Ratnikov, 1993: A-B) frontoparietale, dorsal and ventral views of specimens VSU 530/102 and 384, respectively; C – maxillare, medial, lateral and dorsal views, respectively, of specimen VSU 530/347; D – fragmentary humerus, dorsal and ventral views, respectively, of specimen VSU 530/525.

Fig. 1.— *Bufo belogoricus* Ratnikov, 1993: A-B) vista dorsal y ventral del frontoparietal de los ejemplares VSU 530/102 y 384, respectivamente; C) vistas medial, dorsal y lateral, respectivamente, del maxilar del ejemplar VSU 530/347; D) vista dorsal y ventral de un fragmento de húmero del ejemplar VSU 530/525.

because green toads are characterized as having an “anterior end of maxilla pars facialis that does not project beyond the anterior end of the pars dentalis” (Ratnikov, 2001, p. 17).

“The humeral bone [fig. 1D] is very damaged: the proximal half and distal head are broken. Medial and lateral crests are strongly developed

and have smooth rounded lateral margins. Lateral crests in all of my comparative samples of toads are less developed” (Ratnikov, 2002, p. 35-37). Unfortunately, the humeral characters described distinguish the fossil from modern representatives of both the grey and green toad groups, but its assignment to the last group is even less probable.

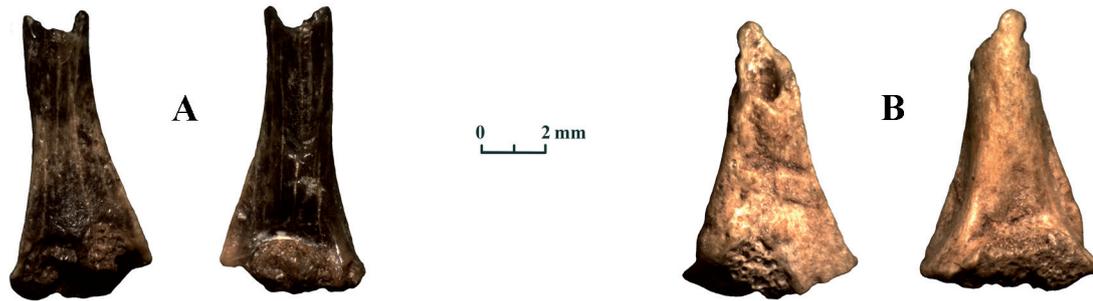


Fig. 2.— *Bufo planus* Ratnikov, 1993: A-B) humeri, dorsal and ventral views of specimens GIN 689H-24 and 25, respectively.

Fig. 2.— *Bufo planus* Ratnikov, 1993: A-B) vista dorsal y ventral del húmero de los ejemplares GIN 689H-24 y 25, respectivamente.

### *Bufo planus* Ratnikov, 1993

This species is based on a humerus (holotype GIN Moscow 689H-24) from the Upper Pliocene of Kotlovina (Ukraine) (Ratnikov, 1993). Four humeri fragments from two localities are noted by Ratnikov (2002).

“All four specimens are partially preserved: the proximal parts are absent. Distal elements show the characters of humeral bone reflected in the diagnosis of the species (Ratnikov, 1993): dorsal surface unusually flat, medial and lateral crests equally, weakly developed and margins nearly straight” (Ratnikov, 2002, p. 37).

In fact, the flattened distal surface (figs. 2A, B) excludes these samples as belonging to the grey toads (*Bufo*), in which the surface is more convex than in green toads. However, ‘green toads’ are organized into two genera, *Epidalea* and *Pseudepidalea* (now synonym of *Bufotes*), and the assignment of this fossil form to the genus *Pseudepidalea* is not clear. In addition, I wish to note that the lateral crest in the fossil form is more developed than in representatives of all three genera of toads currently living in the East European territory, and the bone is thicker in comparison to the estimated size of the distal head. These may be characters indicating its pertinence to toad complexes other than the grey or green toad complexes.

### *Bufo albus* Ratnikov, 1993

This species is based on a humerus (holotype GIN Moscow 825H-2/4) from the Upper Pliocene

of Liventsovka (Russia) (Ratnikov, 1993). In addition to the holotype, there are three humeri fragments and a single ilium fragment.

“Humeral bones [fig. 3B] slender, with a shallow cubital fossa and evenly curved, narrow medial and lateral crests, which do not deviate dorsally. The proximal parts of these bones were not preserved in one of the fossils.

The wing of the iliac bone [fig. 3A] is thick and the preacetabular fossa is absent; the anterior margin of the acetabulum is of moderate height; the preacetabular zone is rather broad; and the tuber superior is long and low, with a smooth surface, without any tubercle” (Ratnikov, 2002, p. 37).

Unfortunately, the humeri fragments do not show any characters allowing them to be related to one of the complexes. But the large thickness of the ilium wing and the absence of preacetabular fossa exclude their identification as *Epidalea* or *Pseudepidalea* (now *Bufotes*). As previously reported “*Ala ossis ilii* is comparatively thick without preacetabular pit” (Ratnikov, 2001, p. 9), which is characteristic of grey toads.

As general conclusions it can be stated that:

1. Characters of green and grey toad groups have been specified only based on species currently living in territories of the former USSR (Ratnikov, 2001). Unfortunately, other species belonging to these complexes are absent in my comparative collection. Therefore, these characters may be biased. However, they may still provide valuable information and should be considered until additional data is obtained.



Fig. 3.— *Bufo albus* Ratnikov, 1993: A) ilium, lateral and medial views of specimen GIN 825H-2/1; B) humerus, dorsal and ventral views of specimen GIN 825H-2/4.

Fig. 3.— *Bufo albus* Ratnikov, 1993: A) vista lateral y medial del ilion del ejemplar GIN 825H-2/1; B) vista dorsal y ventral del húmero del ejemplar GIN 825H-2/4.

2. As we can see from the description, the morphology of frontoparietal and maxillar of *Bufo belogoricus* do not show characters of green toads, whereas the humerus, which is associated with the same species, has no clear characters belonging to any complex due to substantial bone damage. In my opinion, the generic assignment of this species to *Bufo* should be maintained and not changed to *Pseudepidalea* (currently *Bufotes*) as made by Martín *et al.* (2012) until more compelling evidence is discovered. It is impossible to exclude the possibility that this species might belong to a different genus.
3. The humerus of “*Bufo*” *planus* can be related to any genera of green toads as well as to an unknown extinct taxon. In my opinion, the generic name of this species should be qualified in quotation marks until more data becomes available.
4. The generic assignment of *Bufo albus* should remain the same as the ilium of this species shows some attributes of grey toads. However, due to the lack of available information, it is impossible to exclude the possibility that this species could belong to another genus.

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#### References

- Frost, D. R., 2013. Amphibian Species of the World: an Online Reference. Version 5.6 (9 January 2013). Electronic Database accessible at <http://research.amnh.org/herpetology/amphibia/index.html>. American Museum of Natural History, New York, USA.
- Martín, C., Alonso-Zarazaga, M. A. & Sanchiz, B., 2012. Nomenclatural notes on living and fossil amphibians. *Graellsia*, 68(1): 159-180. DOI: 10.3989/graelesia.2012.v68.056
- Ratnikov, V. Yu., 1993. Novye predstaviteli Anura iz verkhnego neogena i plejstocena Vostochno-Evropejskoj platformy. *Paleontologicheskii Zhurnal*, 2: 79-86.
- Ratnikov, V. Yu., 2001. Osteology of Russian toads and frogs for palaeontological researches. *Acta zoologica Cracoviensia*, 44(1): 1-23.
- Ratnikov, V. Yu., 2002. Pozdnekajnozojskie zemnovodnye i cheshujchatye presmykaiushchiesia Vostochno-Euro-

pejskoj ravniny. *Trudy - Voronezskij Gosudarst-vennyj Universitet. Naucno-Issledovatel'skij Institut Geologii*, 10: 1-138.

las cuales las adscripciones genéricas originales no deberían cambiarse a *Pseudepidalea*, como recientemente se ha propuesto, sino mantenerse hasta que se descubra nueva evidencia más convincente.

**Palabras clave:** Nomenclatura; Herpetología; Paleontología; Amphibia; Anura.

#### ABSTRACT

The generic assignment of three fossil forms described as *Bufo belogoricus* Ratnikov, 1993, *Bufo planus* Ratnikov, 1993 and *Bufo albus* Ratnikov, 1993 is discussed. The author justifies why their original generic names should not be changed to *Pseudepidalea*, as recently proposed, but should be maintained until more convincing evidence is discovered.

**Keywords:** Nomenclature; Herpetology; Paleontology; Amphibia; Anura.

#### RESUMEN

**Cambios de asignación genérica en especies fósiles del este de Europa descritas como *Bufo belogoricus* Ratnikov, 1993, *Bufo planus* Ratnikov, 1993 y *Bufo albus* Ratnikov, 1993 (Amphibia, Anura, Bufonidae)**

Se discute la atribución genérica de tres formas fósiles descritas como *Bufo belogoricus* Ratnikov, 1993, *Bufo planus* Ratnikov, 1993, y *Bufo albus* Ratnikov, 1993. El autor justifica las razones por

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