

## Additional Material of *Geronticus balcanicus* Boev, 1998, and Precision of the Age of the Type Locality

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**Abstract:** *Geronticus balcanicus* was known only by the type material (carpometacarpus sin. prox.). New, unknown up to now skeletal element, a fragment of carpometacarpus dex., representing a complete os metacarpalis majus was found in 1994. It comes from the type locality and adds more data both on the morphological and the osteometrical characterization of this fossil species. The dating of the site is determined more precisely as MNQ zone 18a according to the associated mammalian fauna.

**Key words:** ibises, Pliocene avifauna, fossil vertebrates, Balkans, Bulgaria, Paleornithology

### Introduction

The holotype of the Balkan Bald Ibis *Geronticus balcanicus* Boev, 1998, was collected in 1994. Since that time several times excavation works have been done and the total material from the Late Pliocene type locality near the town of Slivnitsa (W Bulgaria, 32 km NW of Sofia, Fig. 1) up to now consists of 108 bone finds (Boev, 1999). Recently, due to the additional data on the macromammalian fauna, the age of this site has been changed from the final MNQ 17 zone to the first half of the MNQ 18a zone (Spassov, 1997), i.e. the very end of the Pliocene. The present paper describes a new find of an ibis, collected in the type locality of *Geronticus balcanicus* and referred to this species.

### Material and Methods

In 1994 a fragment of a right carpometacarpus, representing the os metacarpale majus was collected in the type locality. The find was preliminary misidentified as *Ciconia* sp. (Boev, 1996). It was determined through the comparative osteological collection of Natural History Museum (London) in Tring. All measurements in Table 1 are given in mm.

Abbreviations: NMNHS - National Museum of Natural History (Sofia); NHMT - Natural History Museum (Tring).

### Description

As it was mentioned above, the new find represents a part of a carpometacarpus dextra. Only os metacarpale with the inception of the synostosis metacarpalis distalis majus (coll. N NMNHS 453; Figs. 2, 3) is preserved. The total length of the bone fragment is 42,5 mm.

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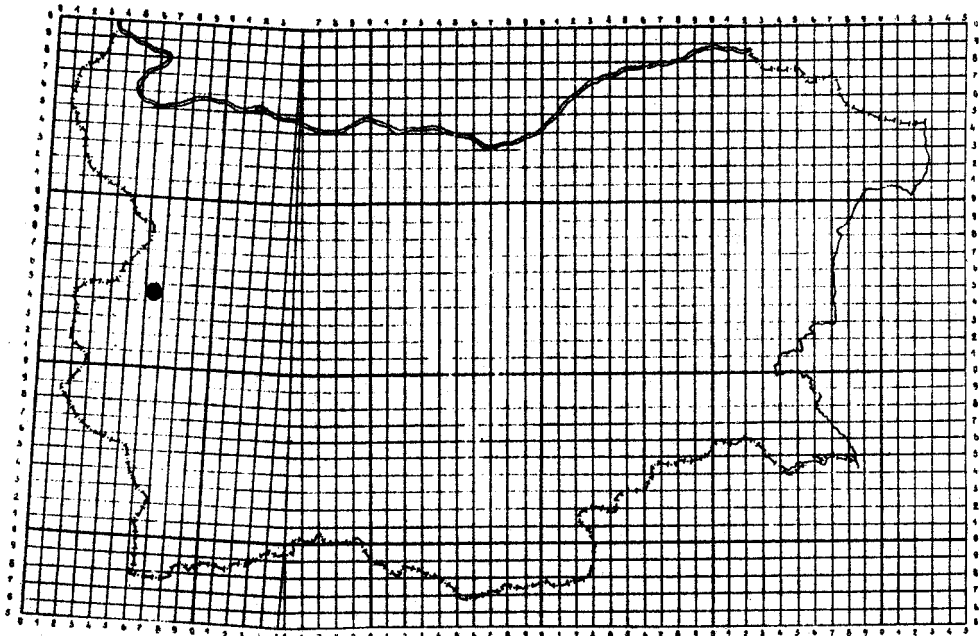


Fig. 1. Location of the Slivnitsa site.

## Comparison

Gruiformes (Gruidae, *Anthropoides virgo* was compared) have right os metacarpalis majus and angular section of the metacarpalis majus from the side of spatium intermetacarpalis.

The general shape and the proportions of the compared find suggest a Ciconiiform bird. It differs from Balinicipidae (*Baliniceps rex*) by the smaller dimensions and the proportions (especially the smaller measurement "b"). It also differs from Ardeidae species by its bigger size as well as the presence of a longitudinal bend, rounder edges and deeper sulcus tendineus. Phoenicopterigidae (*Phoenicopterus ruber*) have straight os metacarpalis majus and shallower sulcus tendimneus. The specimen N 453 differs from *Ciconia ciconia* by its smaller size (Table 1, Fig. 4) and rounder, not angular, ventral surface. It differs from *Ciconia episcopus* by the deeper sulcus tendineus in the distal third and its more medial direction. It differs from *Ciconia abdimii* by the more medial, but not dorsal, position of sulcus tendineus in the distal half of the dorsal surface of os metacarpalis majus. *C. abdimii* also has better developed sulcus tendineus in the proximal part than *C. episcopus* and the specimen from Slivnitsa. *Anastomus lamelligerus* has thinner os metacarpalis majus and its sulcus tendineus has a sharp bend in caudal direction in the middle of the "diaphysis". Its sulcus tendineus also is more clearly marked than in N 453. Besides its dimensional similarity, the find of *G. balcanicus* differs from *Anastomus occitans*, by the shallower sulcus tendineus in the proximal half. In *A. occitans* it is deep not only in the distal, but also in the proximal part. The Bulgarian finds differs from *Mycteria ibis* by the deeper sulcus tendineus, especially in its

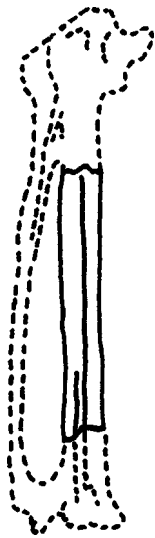


Fig. 2. Righth carpometacarpus with the preserved portion of the fragment.



Fig. 3. *Geronticus balcanicus* - carpometacarpus dex. - os metacarpalis majus.

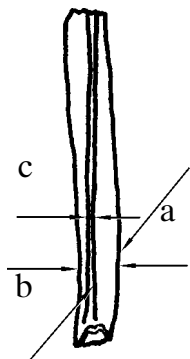


Fig. 4. The manner of measurings: a - width of os metacarpalis majus; b - thickness of os metacarpalis majus; c - width of sulcus tendineus. All measurements are taken in the middle of the os metacarpalis majus length. The measurement "c" is taken in some cases very approximatively through the microscope of 5 x magnification.

Table 1. The measurements of fossil and recent Threskiornithidae.

Species	a	b	c
Fossil			
<i>Geronticus balcanicus</i> NMNHS 453	5,1	5,9	1,5
Recent			
<i>Egretta alba</i> NHMT 1850.11.14.16	3,6	4,8	0,9
<i>Ardea goliath</i> NHMT 1866.4.25.7	4,7	6,2	ca.1,0
<i>Baliniceps rex</i> NHMT 1901.10.20.157	5,9	9,4	1,7
<i>Ciconia ciconia</i> NHMT 1847.12.11.11	6,1	7,6	1,6
<i>Ciconia ciconia</i> NHMT 1973.66.34	5,5	7,3	1,6
<i>Ciconia nigra</i> NHMT 1896.2.16.35	6,2	8,1	1,8
<i>Ciconia abdimii</i> NHMT 1958.10.1	4,7	5,5	1,3
<i>Ciconia episcopus</i> NHMT 1870.6.22.7.	4,9	5,8	1,6
<i>Ciconia episcopus</i> NHMT 1955.5.3	4,7	6,0	1,6
<i>Ciconia episcopus</i> NHMT 1850.8.15.45	4,7	6,9	1,7
<i>Anastomus lamelligerus</i> NHMT 1891.7.20.96	4,4	5,7	1,2
<i>Anastomus lamelligerus</i> NHMT 1952.1.102	4,3	5,4	1,2
<i>Anastomus occitans</i> NHMT 1915.4.1.1	4,9	5,9	1,6
<i>Mycteria ibis</i> NHMT 1865.10.9.7	5,4	6,3	5,0
<i>Mycteria leucocephala</i> NHMT 1973.66.29	5,1	6,1	1,7
<i>Ephippiorhynchus senegalensis</i> NHMT 1868.3.21.26	5,9	8,1	2,0
<i>Leptoptilus javanicus</i> NHMT 1850.8.15.62	6,6	9,0	2,5
<i>Plegadis falcinellus</i> NHMT 1904.12.20.1	3,2	3,8	ca.1,0
<i>Geronticus calvus</i> NHMT 1867.7.8.9	4,4	5,5	1,7
<i>Platalea leucorodia</i> NHMT 1952.1.113	4,5	5,2	1,4
<i>Hagedashia hagedash</i> NHMT 1881.1.17.99	4,5	5,0	1,4
<i>Threskiornis aethiopicus</i> NHMT 1952.3.146	4,8	5,6	ca.1,7
<i>Lophotibis cristata</i> NHMT 1878.7.26.1	4,4	5,6	ca.1,7
<i>Phoenicopterus ruber</i> NHMT 1975.105.10	4,9	5,7	ca.1,0
<i>Anthropoides virgo</i> NHMT s/1953.31.2	5,5	6,0	1,5

distal half, as well as its more medial orientation in the distal half. The differences from *Mycteria leucocephala* are shown in the slightly bent os metacarpalis majus, while in *M. leucocephala* it is straight. *Ephippiorhynchus senegalensis* has much larger dimensions and less developed sulcus tendineus. *Leptoptilus* spp. have bigger size and straight os metacarpalis majus. Thus the N 453 find could not be referred to family Ciconiidae.

A brief review of the fossil record of Threskiornithinae was presented by Boev (1998) where the carpometacarpus bone (i.e. the find of the holotype) was compared with both fossil and recent ibises. The N 453 specimen from Slivnitsa has bigger dimension than *Plegadis falcinellus* (Table 1), bent os metacarpalis majus and deeper sulcus tendineus. Its differences from *Platalea leucorodia* are: deeper sulcus tendineus and bent os metacarpalis majus, while the ones from *Hagedashia hagedash* are rounder, but not quadratic in section of the os metacarpalis majus in its proximal end. It differs from *Threskiornis aethiopicus* by the deeper and clearly formed sulcus tendineus, while from *Lophotibis cristata* it differs by the deeper sulcus tendineus and rounder section of the os metacarpalis majus of its medial side. *Geronticus calvus* stands very closely to the N 453 find compared by all morphological features. The portion of os metacarpalis majus where processus intermetacarpalis protrudes on the caudal side up to the synostosis metacarpalis distalis is preserved on the find. Hence, we refer the Late Pliocene

carpometacarpal fragment from Slivnitsa to *Geronticus balcanicus* - a fossil Bald Ibis, described from the same locality and the same age.

## Discussion

The NMNHS 14 (holotype, Boev, 1998) and NMNHS 453 finds represent the only Tertiary record of g. *Geronticus* on the Balkans and East Europe. They elucidate the presence of Bald Ibises in the region during the very end of the Pliocene. Their fate is obscure during the Pleistocene. According to Tyrberg (1998) the stratigraphic range of *Geronticus eremita* encompasses "Late Pliocene/Early Pleistocene (MN 18) - present" (p. 492). The only two fossil records of this species (Late Pliocene/Early Pleistocene in Eastern Spain and Middle Pleistocene in Sicily, Italy) are dated 1,6-2,7 MA (MN 17/18) and 0,5 MA respectively). The numerous historical records of *Geronticus eremita* up to the 17<sup>th</sup> century possibly indicate the native South-European or even Middle East (Fore-Asian) origin of this species.

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# Допълнителен материал от *Geronticus balcanicus* Воев, 1998, и прецизиране на възрастта на типовото находище

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(Резюме)

*Geronticus balcanicus* бе известен само по типовия материал (carpometacarpus sin. proх.). През 1994 г. бе събран нов, неизвестен досега скелетен елемент от този фосилен вид - фрагмент от carpometacarpus dex., представляващ цялата os metacarpalis majus (No NMNHS 453). Макар да произлиза от типовото находище от Варовиковата карьера „Козяка“ край гр. Сливница, тя е първото потвърждение за съществуването на късноплиоценския балкански горски ибис и разширява морфологичната и остеометрична характеристика на вида, все още ограничена единствено върху скелета на дисталния дял от предните крайници. Прецизирана е възрастта на находките на вида според новите данни от състава на асоциираната бозайната фауна в находището, а именно - MNQ зона 18a.