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Cretaceous Research 75 (2017) 94–100

Contents lists available at ScienceDirect

Cretaceous Research

journal homepage: www.elsevier.com/locate/CretRes

# An *Ichthyornis*-like bird from the earliest Late Cretaceous (Cenomanian) of European Russia

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ARTICLE INFO

*Article history:*
Received 28 November 2016
Received in revised form
26 February 2017
Accepted in revised form 12 March 2017
Available online 14 March 2017

*Keywords:*
Cenomanian
East Europe
Ornithuromorpha
Palaeobiogeography

ABSTRACT

Ornithuromorph birds (the clade which includes modern avian radiation) first appeared in the Early Cretaceous in Asia and achieved a great diversity during the latest ages of the Late Cretaceous (Campanian and Maastrichtian). The evolutionary history of orithuromorphs during the first 17 MYAs of the Late Cretaceous (Cenomanian to Santonian ages) remains very poorly known, as the fossil record for this time interval is largely restricted to several isolated finds of the classic avian genus *Ichthyornis* in North America. Here we describe an isolated distal tibiotarsus of an evolutionary advanced bird, morphologically similar to *Ichthyornis*, from the middle Cenomanian of Saratov Province, European Russia. This is the first documentation of an *Ichthyornis*-like bird in the Old World. The find further constitutes only the second pre-Campanian record of the Late Cretaceous Ornithuromorpha in Eurasia, the second record of Cenomanian birds in Russia. This discovery shows that *Ichthyornis*-like birds enjoyed a wide geographical distribution as early as the beginning of the Late Cretaceous. Given that the earliest and the most primitive ornithuromorph birds are known from Asia, the new find supports a Eurasian origin for Ichthyornithidae.

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## 1. Introduction

Ornithuromorpha, the clade which includes all modern birds, first appeared in the fossil record about 131–134 Ma in the middle Early Cretaceous (Hauterivian) in China (Wang et al., 2015). A remarkable diversity of ornithuromorph birds is known from the somewhat younger, early Aptian (about 125 Ma) deposits in China (reviewed in O'Connor et al., 2011; Mayr, 2017; see also Wang et al., 2013; Liu et al., 2014; Zhou et al., 2014), and one taxon (*Ambiortus*) is known from the Hauterivian-Barremian (133.9–126.3 Ma) of Mongolia (Kurochkin, 1985; O'Connor and Zelenkov, 2013). The fossil record of Ornithuromorpha becomes especially reach in the terminal ages of the Late Cretaceous, Campanian and Maastrichtian, when several primitive members of the clade (*Patagopteryx*, *Hollanda*, *Apsaravis*, *Vorona*) coexisted along with more advanced Hesperornithes, Ichthyornithes, as well as modern-looking birds, apparently related to Neornithes and sometimes even included within the crown group Aves (Hope, 2002; Mayr, 2009, 2017; O'Connor et al., 2011). However, an older, late Early Cretaceous and early Late Cretaceous (Cenomanian to Santonian ages) diversity of ornithuromorph birds remains extremely poorly known. One taxon, *Horezmavis*, has been described from the uppermost Lower Cretaceous (Albian or lower Cenomanian) of Uzbekistan (Nessov and Borkin, 1983), and a primitive hesperornithiform genus *Enaliornis* occurs in the Albian of Europe (Seeley, 1876; Bell and Chiappe, 2016). A presumed ornithurine bird *Cerebavis* (originally referred as to Enantiornithes, but see Walsh and Milner, 2011; Zelenkov and Kurochkin, 2015; Walsh et al., 2016) has been described based on incomplete skull (originally thought to be a brain endocast, but see Walsh and Milner, 2011; Zelenkov and Kurochkin, 2015; Walsh et al., 2016) from the middle Cenomanian of European Russia (Kurochkin et al., 2006).

The early Late Cretaceous fossil record of ornithuromorph birds in North America is richer, but the pre-Campanian finds are all represented by *Ichthyornis* or morphologically similar forms

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http://dx.doi.org/10.1016/j.cretres.2017.03.011
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