



## EARLY MIOCENE BIRDS OF TUCHOŘICE, CZECH REPUBLIC

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**Abstract.** The avian fauna of Tuchořice consists of several indeterminate accipitrid hawks, a *Polemaetus* eagle, and a *Coturnix* quail.

■ Aves, Miocene, Czech Republic.

### INTRODUCTION

Fossiliferous deposits at Tuchořice in northwestern Bohemia were discovered in the mid 19<sup>th</sup> century (Suess 1861, Slavík 1869). After their rediscovery in 1972, they were explored by Oldřich Fejfar and co-workers in 1974–1994 (Fejfar et Kvaček 1993, Fejfar, pers. communication). Three different facies could be distinguished, two of which (Tuchořice 1, and Tuchořice 2 – “the first facies” and “the second facies” of Fejfar et Kvaček 1993) yielded numerous plant, invertebrate, and vertebrate remains (see Fejfar and Kvaček 1993). The fauna from Tuchořice belongs in the MN-zone 3b (Fejfar 1990, Mein 1990, Fejfar et Kvaček 1993).

The birds from Tuchořice were mentioned for the first time by Mlíkovský (1980), who described two endocranial casts of accipitrid hawks from the site Tuchořice 1 (see also Mlíkovský 1992, 1996). Full description of avian remains from Tuchořice is given below.

The stratigraphy of the Neogene follows Mein (1990) and Steininger et al. (1996), that of the Paleogene follows Schmidt-Kittler (1987).

### SYSTEMATIC LIST

Order Falconiformes SHARPE, 1874

Family Accipitridae VIEILLOT, 1816

Genus *Polemaetus* HEINE, 1890

*Polemaetus* sp.

**Material** (Tuchořice 2): four ungual phalanges, two pedal non-ungual phalanges.

**Comparison:** In all accipitrids, the proximal end of ungual phalanges is formed by concave articular surface. Its upper end (“upper processus”) is typically short and blunt, ending with a transverse rugous ridge. In a few species, upper processus is prolonged beyond this ridge, forming there a broad, rectangular surface. I found the latter character in several fossil ungual phalanges from Tuchořice, and in the following modern genera: *Spizastur* GRAY, 1841, *Lophaetus* KAUP, 1847, *Spizaetus* VIEILLOT, 1816, *Stephanoetus* SCLATER, 1922, *Polemaetus* HEINE, 1890, and *Urotriorchis* SHARPE, 1874 (see Mlíkovský 1999a).

Ungual phalanges of the Tuchořice eagle differ from *Lophaetus* in having the heel ventrally less convex, from *Spizastur* and *Stephanoaetus* in having upper processus more prolonged, and the angle between the body of the phalanx and its heel narrower (in *Stephanoaetus*, the heel is oriented much more ventrally). The fossil agrees with *Polemaetus*, *Spizeaetus* and *Urotriorchis* in having proximal articular surface markedly hearth-shaped, upper processus very long and broad, and elevated above the body of the phalanx, and heel laterally compressed, with sharp medial keel on its ventral surface. The fossil differs from *Spizeaetus* in having ventral surface of the heel slightly convex (not straight), and from *Urotriorchis* in lacking small flat spot at the lower border of the articular surface. In all observable details, unguinal phalanges of the Tuchořice eagle agree with those of the modern *Polemaetus bellicosus* (DAUDIN, 1800), and I identify them as belonging to the genus *Polemaetus*. The non-ungual pedal phalanges are tentatively attributed to *Polemaetus* because of their size.

*Polemaetus* is currently a monotypic genus, which inhabits wooded steppes of the Afrotropics (Brown et al. 1982, del Hoyo et al. 1994). The Martial Eagle *Polemaetus bellicosus* is a very large eagle. The Tuchořice eagle was slightly smaller.

All fossil species known from comparably old and geographically close countries (see Mlíkovský 2002) were smaller than the martial eagle from Tuchořice. Nevertheless, an unnamed unguinal phalanx from the early Miocene (MN 2) of Saint-Gérard-le-Puy (Milne-Edwards 1869, pl. 183, figs. 20–21) seems to be similar in both morphology and size to the same element of the Tuchořice eagle. It can be regarded as a first piece of evidence for the existence of *Polemaetus* eagles in Saint-Gérard-le-Puy (see also Mlíkovský 1999a, 2002: 193).

**Remarks:** The fossil record of Oligo-Miocene accipitrid raptors is rather rich, but the fossils have not been revised recently, which casts considerable doubt on the validity of the record (see Olson 1985, Mlíkovský 2002). Whatever is the taxonomical position of these species, all appear to be significantly smaller than the *Polemaetus* eagle from Tuchořice.

*Cygnus bilineatus* LAUBE, 1909 from the early Miocene (MN 3) of Břešťany in the Czech Republic was originally described as a swan, and later believed to be an accipitrid raptor (Brodkorb 1964). It is a stork, however (Mlíkovský et Švec 1989, Mlíkovský 1999b).

Oligocene to early Miocene deposits of the Americas yielded numerous accipitrid or potentially accipitrid taxa (see Brodkorb 1964 for their list), the taxonomic position of which has not been sufficiently clarified yet. The Asian record is limited to *Buteo circooides* KUROČKIN, 1968, *Tutor dementjevi* KUROČKIN, 1968 and *Gobhierax edax* KUROČKIN, 1968 from the middle Oligocene of Tatal-Gol in Mongolia, and *Mioaegyptius gui* HOU, 1984 from the middle Miocene of Sihong in eastern China. *Mioaegyptius* was a large vulture (Hou 1984), while the three forms from Mongolia were much smaller than the *Polemaetus* from Tuchořice.

### **Genus indet.**

**Material** (Tuchořice 1): 2 endocranial casts; (Tuchořice 2): 14 unguinal phalanges.

**Remarks:** These unguinal phalanges, which represent at least 3 different genera of accipitrid raptors, are of generalized form, and cannot be properly identified. However, shape of the upper processus allows to exclude the *Polemaetus* group of eagles (see Mlíkovský 1999a), while the distinctive heel differentiates them from the *Pernis* group of

accipitrids. All these forms were much smaller than the fossil *Polemaetus* sp. from Tuchořice and Saint-Gérard-le-Puy.

The natural endocranial casts of brains (“fossil brains”) were described and figured by Mlíkovský (1980). They are indeterminate within the family as yet, but belonged to hawks decidedly smaller than was the Tuchořice eagle. Their body mass could be estimated at ca. 800–1200 g (Mlíkovský 1980, see also Mlíkovský 1989). It is probable that both of the casts – plus some of the ungual phalanges – belonged to a single species.

Order Phasianiformes TEMMINCK, 1820

Family Phasianidae VIGORS, 1825

Genus *Coturnix* BONNATERRE, 1791

***Coturnix gallica*** (MILNE-EDWARDS, 1869)

*Palaeortyx gallica* MILNE-EDWARDS, 1869: 230 [See Mlíkovský (2002: 153–154) for the extensive synonymy of *Coturnix gallica*.]

*Coturnix gallica* (MILNE-EDWARDS): Mlíkovský 2002: 154 [New combination.]

Material (Tuchořice 2): distal part of right ulna.

Remarks: *Coturnix gallica* was recorded from the middle Oligocene (MP 25) to the late Miocene (MN 12) of Spain, France, Germany, Czechia and Hungary (see Mlíkovský 2002).

## DISCUSSION

The avian fauna of Tuchořice is characterized by numerous raptors (at least four species), and an almost entire absence of other forms. This is in good agreement with the mammalian fauna, in which carnivores are predominant (Fejfar et Kvaček 1993). The locality was formed around hot springs. Molluscs provided circumstantial evidence for their toxicity (see Fejfar and Kvaček 1993). It is thus possible, that both avian and mammalian predators were attracted to the site by bodies of other animals, and subsequently died there.

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