

# Taxonomic identity of *Fringilla radoboyensis* VON MEYER, 1865 (Aves) from the middle Miocene of Croatia

by Jiří MLÍKOVSKÝ<sup>1</sup>

(With 3 textfigures)

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## Summary

The taxonomic status of *Fringilla radoboyensis* VON MEYER, 1865 from the middle Miocene of Croatia was reexamined. The species was transferred to the modern genus *Merops* of the family Meropidae. It represents the first named fossil representative of this family.

**Keywords:** Aves, Meropidae, Miocene, Croatia.

## Zusammenfassung

Die taxonomische Identität der *Fringilla radoboyensis* VON MEYER, 1865 aus dem Mittel-Miozän Kroatiens wurde untersucht. Die Art wurde in die lebende Gattung *Merops* der Familie Meropidae überführt. Es handelt sich um den ersten benannten fossilen Vertreter dieser Familie.

**Schlüsselwörter:** Aves, Meropidae, Miozän, Kroatien.

## Introduction

*Fringilla radoboyensis* VON MEYER, 1865 is the only Tertiary bird described from Croatia thus far (MLÍKOVSKÝ 1996a). It is known from the holotype only and, since its description in 1865, has probably never been examined by any paleornithologist until I rediscovered it in 1982 in the Museum of Natural History in Vienna, Austria. The results of my restudy of *Fringilla radoboyensis* are presented below.

## History of the research

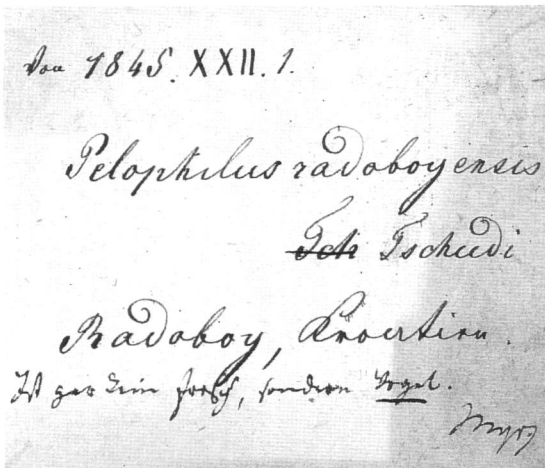
The following history could be deciphered from the two labels attached to the holotype and from the published literature. The holotype appears to have been found in 1844 or 1845: Heinrich FREYER (1802-1866), the then director of the Natural History Museum in Ljubljana (formerly Laibach), did not mention it in the 1843 report on the animal

<sup>1</sup> Dr. Jiří MLÍKOVSKÝ, Institute of Geology and Paleontology, Charles University, Albertov 8, CZ-128 43 Praha 2. – Czech Republic.



Fig. 1. Labels attached to the holotype of *Fringilla radoboyensis*.

A. Older label. The relevant text reads: "*Batrachites Radoboyensis* FREYER // Sehr wahrscheinlich [= quite probably] *Palaeobatrachus Goldfussi* TSCHUDI = *Rana diluviana* GOLD. // *Pelophilus radoboyensis* TSCHUDI".



B. Younger label. The relevant text reads: "*Pelophilus radoboyensis* ~~Freyer~~ TSCHUDI // Radoboy, Croatien // Ist gar kein Frosch, sondern Vogel [= Is not a frog at all, but a bird] MEYER".

remains from the Radoboj site (FREYER 1844). The labels attached to the specimen (Fig. 1) indicate that it was obtained by the "Mineralien-Kabinett" (now Museum of Natural History) in Vienna in 1845 through the geologist A. MORLOT.

The fossil was scientifically examined for the first time by FREYER, who misidentified it as a frog and coined the name *Batrachites Radoboyensis*. This name appears on one of the two labels attached to the holotype (Fig 1A), but apparently has never been properly published. According to a hand-written remark on the same label, an unknown worker considered this species to be identical with *Palaeobatrachus Goldfussi* VON TSCHUDI, 1839; this in turn was considered a synonym of *Rana diluviana* GOLDFUSS, 1831. At some later date this note was crossed out and the label furnished with the name "*Pelophilus radoboyensis* TSCHUDI".

The second label (Fig. 1B) was probably initiated by J.J. VON TSCHUDI. It appears that VON TSCHUDI examined the holotype and subsequently transferred the species to the fos-

sil frog genus *Pelophilus*, created earlier by himself for *Pelophilus agassizii* VON TSCHUDI, 1839 from the middle Miocene of Öhningen, Bavaria, Germany (VON TSCHUDI 1839). In accordance with the nomenclatural customs of his time, VON TSCHUDI labeled this new combination with his own name. Later, possibly in 1849 (cf. VON MEYER 1850: 203), Moritz HÖRNES, director of the "Mineralienkabinet" in Vienna, sent the fossil for examination to Hermann VON MEYER (1801-1869). He was the leading vertebrate paleontologist of Central Europe and correctly identified the fossil as a bird (VON MEYER 1850, 1864, 1865), finally transferring it to the modern genus *Fringilla* (VON MEYER 1865). He was apparently not aware of FREYER's name for the fossil and attributed the name to VON TSCHUDI (evidently only the second label was available to him). Again, following the nomenclatural customs of those times, VON MEYER labeled the new combination with his own name. Despite this history, VON MEYER (1865: 125) was the first to publish the name in a manner required by the ICZN (1985), thus making the name available for nomenclatural purposes. Consequently, he must be considered to be its author.

### Systematic paleontology

Order Coraciiformes FORBES, 1884

Family Meropidae VIGORS, 1825

Genus *Merops* LINNAEUS, 1758

#### *Merops radoboyensis* (VON MEYER, 1865)

(Figs. 2-3)

*Batrachites Radoboyensis* H. FREYER, between 1844-1845 (label name, not available for nomenclatural purposes)

*Pelophilus Radoboyensis* (FREYER): J.J. VON TSCHUDI, between 1845-1849 (new combination, label name, not available for nomenclatural purposes)

*Fringilla (?) Radoboyensis* VON MEYER, 1865: 125, Pl. XXX, Fig. 1 (thought to be new combination, but in fact a valid description)

*Merops radoboyensis* (VON MEYER): MLÍKOVSKÝ, this paper (new combination)

**H o l o t y p e :** Partial skeleton of hind limbs; Department of Geology and Paleontology, Museum of Natural History, Vienna, Austria, Inv.Nr. 1845/XXII/1.— Figs. 2 and 3.

**A g e and l o c a l i t y :** The holotype of *Fringilla radoboyensis* was found in the middle Miocene deposits of Radoboj (Radoboy) near Krapina, north of Zagreb in Croatia. Its age was not exactly known to VON MEYER (1865), who considered it simply "Tertiary". Subsequently, the Radoboj site was specified as Sarmatian (THENIUS 1959); this corresponds to the younger part of the middle Miocene, or to the micromammal Neogene zones MN 7-8 sensu STEININGER et al. (1987). Recent micropaleontological research of the middle Miocene deposits around Krapina by BAJRAKTAREVIĆ (1984) dated two of the localities (Lopatnica and Gornja Šemnica) as early Sarmatian, and one (Frug) in the nanoplankton zones 6-7. It is probable from this context that the classical Radoboj site belongs in micromammal zone MN 7 (sensu MEIN 1990).

**Description** of the holotype: Only a few leg bones of the bird were preserved. These include distal part of the humerus, tibiotarsus, proximal part of the fibula, tarsometatarsus and a few phalanges digitorum pedis of one leg, as well as distal part of tibiotarsus, tarsometatarsus and a few phalanges digitorum pedis of the other leg. The bones are deeply embedded in the matrix, with the exposed parts heavily damaged or missing. The result is that when examined directly by the naked eye, the bones appear very slender; in fact they are much more robust. No morphological details can be discerned, nor was I able to determine which bones originated from which body side.

**Measurements** of the holotype: Maximum length of the first leg's tibiotarsus = 19.9 mm; maximum length of the second leg's tarsometatarsus = 9.7 mm. Other bones provide no meaningful dimensions.

**Taxonomic position**: The fossil under study was first identified as a frog by H. FREYER (label data) and J.J. VON TSCHUDI (label data), and later re-identified as a bird by VON MEYER (1850, 1864, 1865). In the absence of morphological characters, VON MEYER (1865) used metrical characters, particularly the ratio of tibiotarsus to tarsometatarsus length, in order to estimate possible taxonomic relations. He compared this ratio with that in 6 modern passerine species and *Columba*, inexplicably concluding that it is most similar to that in *Fringilla* (= *Carduelis*) *cannabina*, which it does not resemble at all. This led him to describe the fossil in the genus *Fringilla*.

A comparison of leg proportions contradicts VON MEYER's opinion. The tibiotarsi of most birds are less than 1.7-times longer than the tarsometatarsi (VERHEYEN 1960). Only exceptionally are the tibiotarsi more than 2-times longer than the tarsometatarsi, which is the condition found in *Fringilla radoboyensis* (TT : TMT = 2.05) and further in the Steatornithidae (TT : TMT = 2.77, n = 1 species, VERHEYEN 1956a), Podargidae (TT : TMT = 2.05, n = 1, VERHEYEN 1956a), Trogonidae (TT : TMT = 1.69–2.04, n = 3, VERHEYEN 1956a), Alcedinidae (TT : TMT = 2.29–3.21, n = 11, VERHEYEN 1955), Meropidae (TT : TMT = 2.03–2.36, n = 8, VERHEYEN 1955) and Psittacidae (TT : TMT = (1.33) 1.85–3.21, n = 94, VERHEYEN 1956b). It is apparent that the leg proportions of *Fringilla radoboyensis* agree only with those of parrots (Psittacidae), bee-eaters (Meropidae), frogmouths (Podargidae) and marginally with those of trogons (Trogonidae). Of these families, parrots can be rejected because *radoboyensis* does not have such robust tarsometatarsi; despite the absence of visible morphological characters, the bird could hardly have had a parrot-like foot. All trogons and frogmouths are much larger than *radoboyensis*. On the other hand, bee-eater characters seem to correspond well with those of *Fringilla radoboyensis*. The slenderness of the leg bones mentioned by VON MEYER (1865) would contradict this because the tarsometatarsi of the Meropidae are rather robust (though by far not so much as in the Psittacidae). Microscopic examination of the holotype, however, revealed that the slenderness is illusory and reflects the preservation state of the specimen (see above). In view of this, and in the absence of contrary evidence, I here refer "*Fringilla*" *radoboyensis* with all precaution to the family Meropidae.

Within the Meropidae, two genera are currently recognized (FRY 1984): ancestral *Nyctiornis*, an arboreal insectivore of SE Asian forests, and the derived *Merops*, an aerial insectivore of Old World open areas. No *Nyctiornis* skeleton was available for study. However, because *Nyctiornis* differs from *Merops* in life habits, including locomotion,

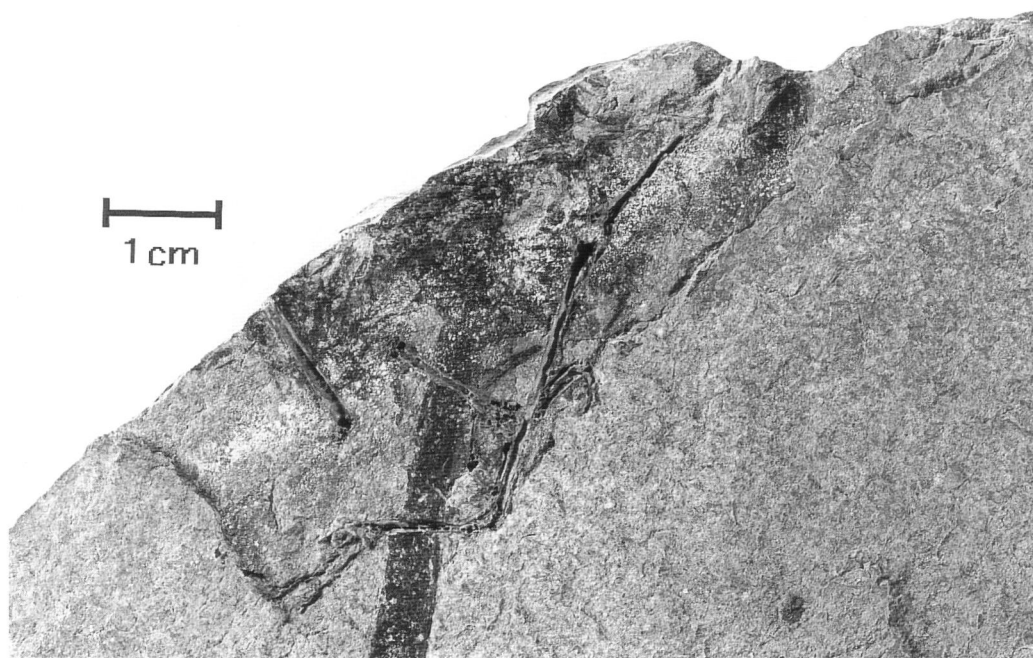


Fig. 2. Holotype of *Merops radoboyensis* (VON MEYER, 1865) from the middle Miocene of Croatia. – Photograph: G. OBERLEITNER (Wien).

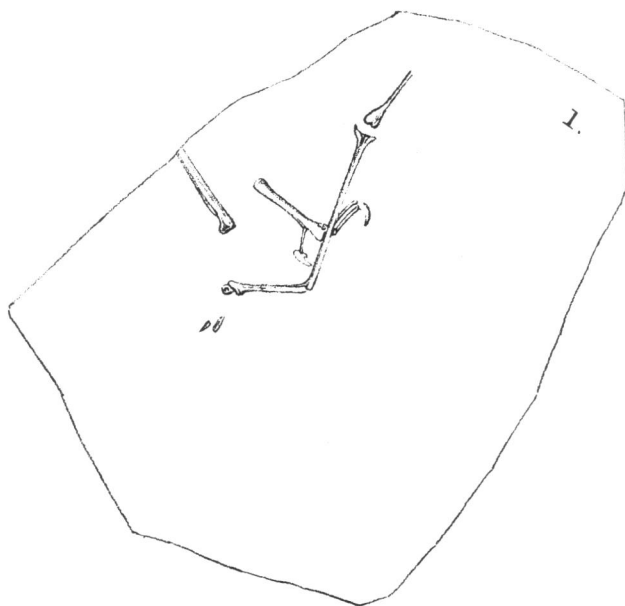


Fig. 3. Drawing of the holotype of *Merops radoboyensis* (VON MEYER). Reprinted from VON MEYER (1865: Pl. XXX, Fig. 1).

it can be assumed that it also differs in leg proportions. As the leg proportions of "*Fringilla*" *radoboyensis* exactly fit those of *Merops* species, I tentatively conclude that it can be included in the latter genus. It should thus bear the name *Merops radoboyensis* (VON MEYER, 1865), new combination. *Merops radoboyensis* was a small bee-eater, approximating the modern *Merops orientalis* in size.

**D i s c u s s i o n:** *Merops radoboyensis* is the first known fossil representative of the Meropidae described thus far (cf. BRODKORB 1971, OLSON 1985, MLÍKOVSKÝ 1996b). As yet undescribed representatives of the Meropidae were recently mentioned from the Eo-Oligocene Phosphorites du Quercy, France (MOURER-CHAUVIRÉ 1982). OLSON (1985: 128) also examined bones that appeared to closely resemble Meropidae; they stem from the early Eocene of Green River, Wyoming, USA, and the middle Eocene of Messel, Hessen, Germany.

Although *Merops radoboyensis* was based on poorly preserved remains to which no name should have been applied, it represents a valuable record of the family Meropidae from the middle Miocene of the Balkan Peninsula.

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