

Porzana botunensis sp. n., a New Early Pleistocene Crake (Aves: Rallidae) from Bulgaria

Zlatozar Boev

National Museum of Natural History, Bulgarian Academy of Sciences, 1 Tsar Osvoboditel Blvd., 1000 Sofia, Bulgaria; E-mail: boev@nmnhs.com; zlatozarboev@gmail.com

Abstract: A new species of crake of the genus *Porzana* is described from the site of Varshets (MN 17). *Porzana botunensis* sp. n. is the second rallid species described from the site. The holotype is a distal half of left tarsometatarsus. The species may be diagnosed using the following characters: an Early Pleistocene crake, differing from the recent *P. porzana* in the: (1) more distally positioned inception of trochlea metatarsi II; (2) shallower edges of the condyles of the trochlea metatarsi II; (3) clearly developed edge (linea) between the facies dorsalis and facies subcutanea lateralis; (4) deeper facies lateralis caudalis and (5) relatively wider incisura intertrochlearis lateralis.

Keywords: Early Pleistocene, Villafranchian fauna, fossil vertebrates, Tertiary birds, family Rallidae, Gruiformes, Balkan Peninsula, Bulgaria

Introduction

The Early Pleistocene (Villanyian, MN 17 zone) vertebrate fauna of the studied site and its taphonomy have been characterised in BOEV (2010). This unique ponor provided a large number of avian fossils of over 74 taxa. Studies at this site started in 1988. It is the type locality of a series of species. The character of the paleoenvironment, according to discovered paleoavi-fauna, was determined as forest-steppe (BOEV 1995; 1999). The Pra-Botunya River passed near the site, while at present it is about 1 km away eastwards.

The aim of the present article is to describe a new Early Pleistocene crake of the genus *Porzana* Vieillot, 1816 recorded the site of Varshets (MN 17).

Material and Methods

The material was collected through screening and washing of sediments. It was identified using reference to comparative bird collections of the ISEA, NHM, NMNHS and UCBL (see abbreviations below).

Characteristic measurements of distal tarsometatarsus in Rallidae: a – width of the diaphysis in the middle; b – minimal thickness of the diaphysis; c – width of tr. m. III; d – diameter of tr. m. III. All measurements are given in mm. Total length of the fragment: 15.3 mm.

Abbreviations

Anatomical: f. m. – fossa metatarsi I; f. l. c. – fovea ligamenti collateralis; tr. m. – trochlea metatarsi;

Institutional: ISEA – Institute of Systematics and Evolution of Animals (Krakow); NHM – Natural History Museum, formerly British Museum (Natural History, Tring); NMNHS – National Museum of Natural History (Bulgarian Academy of Sciences, Sofia); UCBL – University Claude Bernard, Lyon 1 (Lyon).

Taxonomy

Gruiformes Bonaparte, 1854

Rallidae Vigors, 1825

***Porzana* Vieillot, 1816**

***Porzana botunensis* sp. n.**

Holotype: No NMNHS 301 distal half of a left tarsometatarsus of excellent preservation (Fig. 1), collections of the Fossil and Recent Birds Department of the National Museum of Natural History, Bulgarian Academy of Sciences, No NMNHS 301. Collected on 5 June 1992 by Zlatozar Boev.

No additional material was collected.

Locality: A ponor in a rocky hill, 6 km NE of Varshets (43.13 N, 23.17 E).

Stratigraphic position: Unconsolidated, unstratified sediments accumulated in the filling of clay

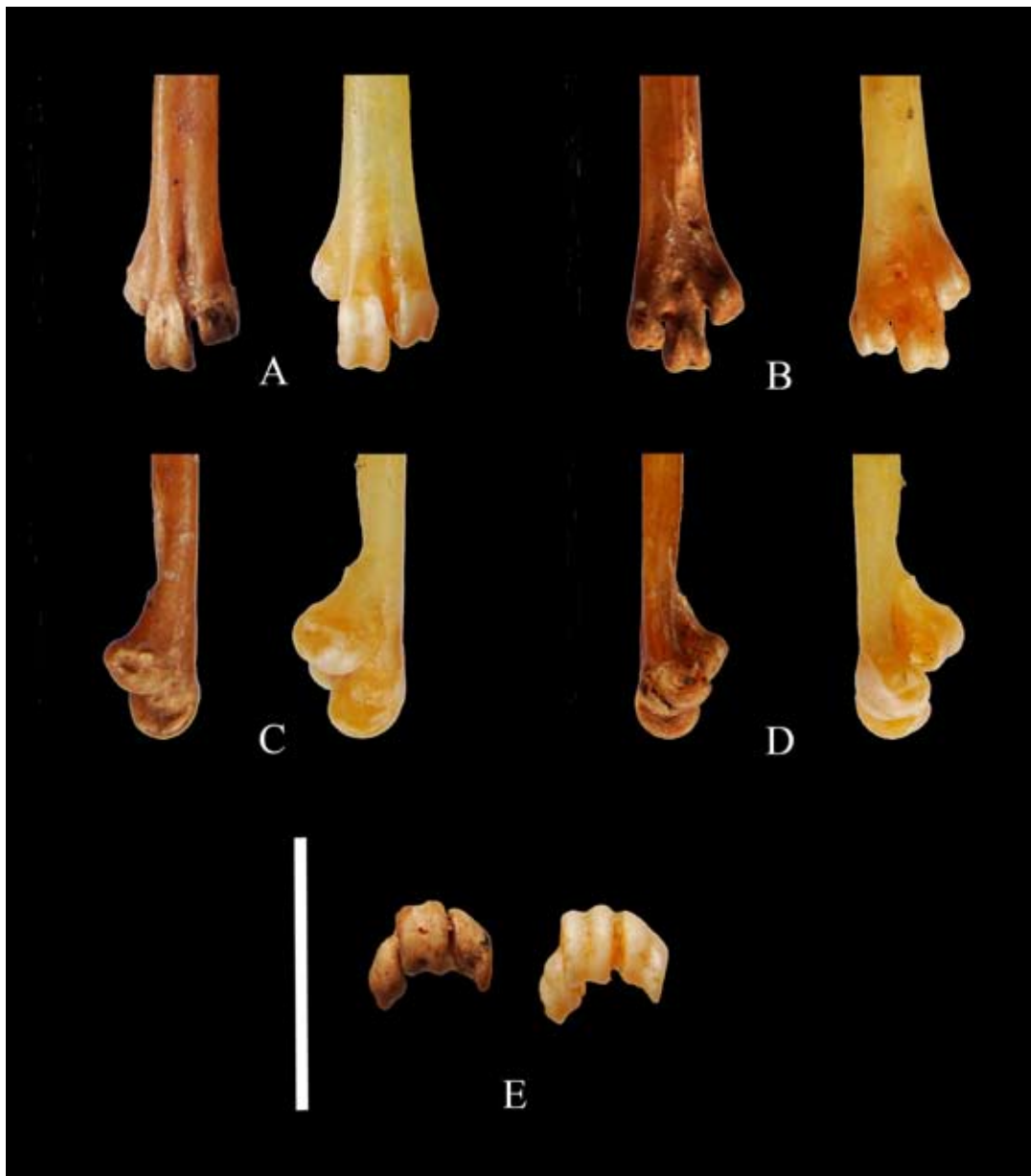


Fig. 1. *Porzana botunensis* sp. n. – tarsometatarsus dex. ad., holotype, Early Pleistocene, Varshets (Bulgaria), No NMNHS 301 (left) and *Porzana porzana* ♂ ad., recent, Sofia Region (Bulgaria) No NMNHS 1/1989 [889] (right): cranial view – A; caudal view – B; medial view – C; lateral view – D; ventral view – E. Scale bar = 1 cm. (Photograph: Assen Ignatov, NMNHS)

terra rossa. The fossil bones are broken, sometimes making a kind of bone breccia.

Chronostratigraphy: Middle Villafranchian. The associated fauna of large mammals attributes the site to the MN 17 zone (SPASSOV 1997) according to the chronostratigraphical system of Mein (1990). POPOV (2001) determines the time span of Varshets between 2.04 Ma (Stranzendorf I) and 2.4 Ma (Stranzendorf D).

Etymology: The name “*botunensis*” is given after the name of the Botunya River, the main geologic agent for the formation of the karstic landscape on the terrain of the locality.

Diagnosis: An Early Pleistocene crane, differing from the recent *P. porzana* in the: (1) more distally positioned inception of trochlea metatarsi II; (2) shallower edges of the condyles of the trochlea metatarsi II; (3) clearly developed edge (linea) between the facies dorsalis and facies subcutanea lateralis; (4) deeper fovea ligamenti collateralis; and (5) relatively wider incisura intertrochlearis lateralis.

For measurements and comparative material examined see Table 1. The total length of the fragment is 15.4 mm.

The finding shows all features characteristic for the tarsometatarsal bone of the small-sized taxa of

the family Rallidae, including almost parallel condyles of the trochlea metatarsi II, III and IV, and much higher position of the trochlea metatarsi II.

Comparison with some recent taxa of other genera of the family Rallidae

The specimen from Varshets differs from:

Rallus aquaticus Linnaeus, 1758 in the smaller size, more asymmetrical tr. m. III in cranial view, shallower relief of the tr. m. IV and tr. m. III, and flat cranial surface (facies dorsalis) of the distal half of diaphysis (Fig. 2);

Laterallus leucopyrrhus (Vieillot, 1819) in the correlation between the diameters of tr. m. III and tr. m. IV;

Sarothrura elegans (A. Smith, 1839) in the thicker and right shaft of diaphysis, bigger diameter of tr. m. II, deeper with clear edges f. m. I, and less developed relief of the tr. m. II;

Amaurornis flavirostris (Swainson, 1837) in the smaller size, less developed relief on tr. m. IV, and deeper and better shaped fossa of foramen vasculare distale;

Crex crex (Linnaeus, 1758) in the smaller size (Table 1), considerably more protruding trochlea metatarsi III beyond the trochlea metatarsi IV in lateral view, and parallel condyles of tr. m. II compared with tr. m. III and tr. m. IV;

Crex egregia (W. K. H. Peters, 1854) in the smaller size, more graduate instead of sharp, transition in medial view of the profile from tr. m. II to the diaphysis;

Canirallus kioloides (Pucheran, 1845) in the relatively narrower tr. m. III (measurements c : d);

Gallinula melanops (Vieillot, 1819) in the smaller size, lower relief of tr. m. II, and sharper, but not round, profile of tr. m. II in medial view;

Porphyrio alleni Thomson, 1842 in the round, but not elongated foramen vasculare distale, smaller size and flatter, but not bow-like cranial surface in the middle of the diaphysis;

Porphyrio martinica (Linnaeus, 1766) in the

smaller size, because that species is very close dimensionally to *P. alleni*.

According to metrical data by JÁNOSY (1991) the specimen from Varshets differs from *Rallicrox polgardiensis* Jánossy, 1991 not only osteometrically, but also morphologically. He writes: “The measurements (*i.e.* of *R. polgardiensis*) are absolutely larger than the same ones of the smaller rallid of Polgardi (*Porzana estramosi veterior* Jánossy, 1991).” (p. 22). The tarsometatarsus of *R. polgardiensis* stands closely to the one of *Crex crex* and shows conspicuous robustness (JÁNOSY, 1991).

The Upper Oligocene or Lower Miocene (Aquitanian or Tortonian) *Paraortygometra porzanoides* (Milne-Edwards, 1869), described from France, besides its close dimensional and morphometrical affinity to the genus *Porzana* (Olson, 1977), could be excluded from our comparison because of the considerable chronostratigraphical differences: MN 4b in Dolnice (Czech Republic; MLÍKOVSKÝ, 1996 b), MN 2a in Saint-Gerand-Le-Pyu and MN 7-8 in La Grive-Saint-Alban (France; Cheneval, 1996). As de Pietri and Mayr (2014) have found, *Paraortygometra* is a stem-representative of Rallidae, another reason to be excluded from the comparisons.

We exclude the similarly-sized species bandbellied crane (*Porzana paykullii* Ljungh, 1813), a species with East-Asian distribution (both breeding and wintering ranges).

The genus *Porzana* (*P. porzana* was compared) has more laterally protruded lateral edge of the distal diaphysis of tmt. above the epiphysis in the area of tr. m. IV in cranial view than in *Zapornia* (*Z. pusilla* and *Z. parva* were compared). In *Z. pusilla* and *Z. parva* it is straighter instead of curved outwards. In this respect the fossil specimen resembles *Porzana*.

The flat cranial surface of diaphysis within the 3rd fourth of its length, round shape of foramen vasculare distale and its position on the cranial surface on the distal epiphysis also refer NMNHS 301 to genus *Porzana*. On the other hand, the specimen NMNHS 301 has a very clearly developed edge (linea) between

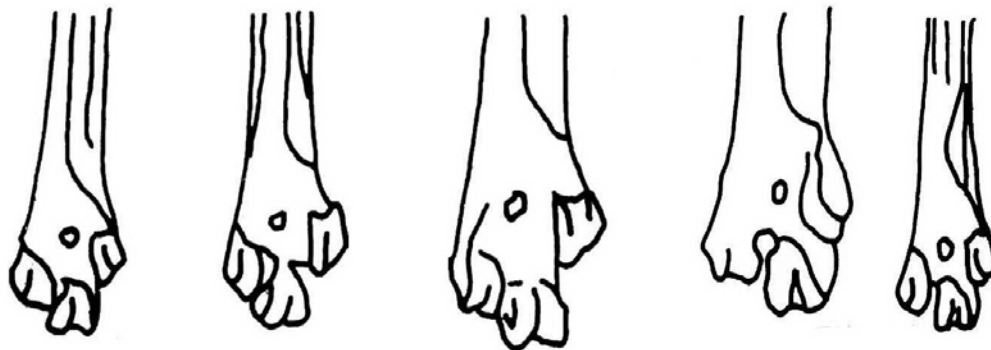


Fig. 2. Ventral view of distal left tarsometatarsus in some West-Palaeartic rallids (left to right): *Porzana botunensis* sp. n., *Z. parva*, *Rallus aquaticus*, *Crex crex*, *Z. pusilla* (Drawing: Vera Hristova)

facies dorsalis and facies subcutanea lateralis in contrast to all compared recent species of *Porzana*.

Recent and fossil crakes of *Porzana* and *Zapornia*

Summarising data on the fossil record of Rallidae, OLSON (1985) states that rails occur regularly in the Neogene deposits of the Northern hemisphere. CRACRAFT (1973) and OLSON (1977) list no data on fossil taxa in the genus *Porzana*.

A number of endemic fossil/subfossil late Quaternary (Holocene) extinct crakes of genus *Porzana* have been described also from the Pacific tropical islands: *Porzana rua* Steadman 1986 – Holocene of Mangaia, Cook Islands, Pacific Ocean; *Porzana zieglerei* Olson & James 1991 – Holocene of Oahu, Hawaiian Islands; *Porzana menehune* Olson & James 1991 – Holocene of Molokai, Hawaiian Islands; *Porzana keplerorum* Olson & James 1991 – Holocene of Maui, E Hawaiian Islands; *Porzana ralphorum* Olson & James 1991 – Holocene of Oahu, Hawaiian Islands; *Porzana severnsi* Olson & James 1991 – Holocene of Maui, E Hawaiian Islands; *Zapornia astrictocarpus* (Olson 1973) – Late Holocene (extinction after 1502 AD) of Str. Helena, S Atlantic Ocean. Most of them are flightless forms of very restricted island ranges.

According to BOCHEŃSKI (1997) 12 Neogene and one Quaternary rallids have been described from Europe, but only one (*Porzana estramosi* Jánossy, 1979) is referred to the genus *Porzana*. According to MLÍKOVSKÝ (2002) the genus *Porzana* is known from Europe since the Middle Miocene (MN 6-8) from Hungary. The second oldest record came from Varshets (present find listed as *Porzana* sp., but erroneously dated MN 18, instead of MN 17). Mlíkovský (2002) also states that *P. estramosi* is the only fossil species of the genus in Europe.

Comparison with fossil species of the genus *Porzana*

The fossil record of the genus spans over the period from the Middle Miocene MN 6-8 to Late Pleistocene (MLÍKOVSKÝ 2002).

Brodkorb (1967) lists three fossil species of *Porzana*: *P. lacustris* Brodkorb, 1958 (Lower Pleistocene, Idaho, USA); *P. auffenbergi* Brodkorb, 1954 (Middle Pleistocene, Florida, USA); and *P. guti* (Brodkorb, 1952) (Middle Pleistocene, Florida, USA). *Porzana auffenbergi* is now placed in *Rallus*. In addition, three other fossil taxa are recognised: *P. estramosi* Jánossy, 1979 (Middle? Miocene – Early Pliocene of Hungary); *P. risilla* (Kurochkin, 1980) (Middle Miocene or Middle Pliocene of Mongolia); *P. piercei* Olson, Wingate, 2000 (Late Pleistocene of Bermuda, W Atlantic). *Porzana risilla*, as Kurochkin

(1985) stated is similar in size to *P. pusilla* and could be excluded from the comparisons.

Metrically the find from Bulgaria lies in the range of genus *Porzana*. *Porzana estramosi* from the Middle Pliocene (“Postpannonian Pliocene”) of Northern Hungary was described by a distal fragment of left tarsometatarsus (JÁNOSY, 1979). It is a species “smaller than any hitherto described fossil and recent continental forms” (p. 20). As it is seen from Table 1, the specimen from Bulgaria has intermediary for the genus *Porzana* measurements and may not be referred dimensionally to *P. estramosi*. The photograph 4-8 on p. 18 of the paper by JÁNOSY (1979) shows that both medial and lateral edges of the base of diaphysis above the tr. m. III in *P. estramosi* form a clear narrowing, that is not present in *P. botunensis* sp. n.. Later D. Jánossy describes a Late Miocene subspecies of *P. estramosi*: *P. e. veterior* Jánossy, 1991, based chiefly on its smaller dimensions. He establishes that *P. e. veterior* has longer and slenderer tarsometatarsi in comparison with *Z. parva*: a character that also excludes the taxonomic identity of the Bulgarian specimen and *P. estramosi*. MLÍKOVSKÝ’S (1996c) summary data show that no fossil record of genus *Porzana* is known from Europe except from the sites of Varshets (Bulgaria), Polgardi and Osztramos 9 (Hungary). TYRBERG (1998) cites the opinion of J. Mlíkovský who states that the Middle Pleistocene (MNQ 21) finds of *Porzana* sp. from Stranska in the Czech Republic (Monrovia) belong to “...a form larger than *P. porzana*, probably an extinct species.” (p. 527). No fossil taxa among the small rallids have been described from the Pleistocene deposits of Europe (Tyrberg, 1998). Three other extinct species, *Zapornia palmeri* (Frohawk, 1892), *Z. sandwichensis* (Gmelin, 1789) and *Z. nigra* (J. F. Miller, 1784) disappeared between 1785 and 1944 (TAYLOR 1996). The two first species were endemic for the Hawaiian Islands, while the third one was endemic for the Tahiti Islands. *Zapornia monasa* (Kittlitz, 1858) from the Kosrae Island (Micronesia) disappeared by 1878.

In addition, another island endemic (*Z. astrictocarpus* (Olson, 1973)) was described from St. Helena Island. As Olson (1977) writes “this small flightless species, along with *Porzana palmeri* is apparently derived from Baillon’s crake (*Porzana pusilla*)” (p. 356). Thus, the examined fossil specimen does not need a comparison with these species.

We do not consider all insular endemic Pacific species, as well.

Comparison with recent species of the genera *Porzana* and *Zapornia*

Recently the genus *Porzana* has been split into *Porzana* s. s. and *Zapornia*, Leach 1816 (DICKINSON,

Table 1. Measurements (in mm) of fossil and recent rallids

Species	Width of the diaphysis in the middle (a)	Thickness of the diaphysis in the middle (b)	Width of tr. m. III (c)	Diameter of tr. m. III (d)
Fossil				
<i>Porzana botunensis</i> sp. n. NMNHS 301	2.05	1.6	1.7	2.45
<i>Rallicrox polgariensis</i> ¹	-	-	ca.2.1	-
Recent				
<i>Porzana porzana</i> UCBL 136/1	2.2	1.8	1.8	2.6
<i>Porzana porzana</i> UCBL 136/2	2.4	2.2	2.1	2.6
<i>Porzana porzana</i> ISEA A-5157/93	2.2	2.0	1.9	2.6
<i>Porzana porzana</i> ISEA A-2474/71	2.1	1.8	1.7	2.6
<i>Porzana porzana</i> ISEA A-1848/67	2.2	2.0	-	-
<i>Porzana porzana</i> ISEA A-5156/93	2.2	2.1	1.9	2.8
<i>Porzana porzana</i> NHM 2001.17.1	2.5	2.0	2.0	2.9
<i>Porzana porzana</i> NHM 1957.13.1	2.0	1.7	1.8	2.7
<i>Porzana porzana</i> NHM 1952.2.366	2.2	1.8	1.9	2.4
<i>Porzana porzana</i> NHM 1976.47.1	2.1	1.8	1.8	2.7
<i>Porzana carolina</i> ISEA A-4667/89	2.0	2.0	2.2	2.5
<i>Porzana carolina</i> NHM 1986.60.14	2.2	2.2	1.8	2.9
<i>Porzana carolina</i> NHM 1984.77.13	2.3	2.1	1.9	2.8
<i>Porzana carolina</i> NHM 1984.77.12	2.4	2.2	1.9	2.8
<i>Zapornia parva</i> ISEA A-2538/72	1.9	1.6	2.6	2.4
<i>Zapornia parva</i> ISEA A-5068/92	1.7	1.4	1.4	2.0
<i>Zapornia parva</i> ISEA A-5155/93	1.8	1.5	1.5	2.5
<i>Zapornia parva</i> NHM 1999.22.1	2.0	1.6	1.4	2.3
<i>Zapornia parva</i> NHM 1968.4.1	1.9	1.6	1.5	2.3
<i>Zapornia parva</i> NHM 1952.2.365	ca. 1.9	ca. 1.9	ca. 1.7	-
<i>Zapornia pusilla</i> ISEA A-4481/87	1.8	1.5	1.5	2.1
<i>Zapornia pusilla</i> NHM 1996.69.12	1.9	1.5	1.4	2.1
<i>Zapornia pusilla</i> NHM 1978.4.1	1.8	1.4	1.5	2.1
<i>Zapornia fusca</i> NHM 1850.8.15.140	1.9	1.9	1.8	2.5
<i>Rallus aquaticus</i> ISEA A-5158/93	2.4	2.3	2.2	3.2
<i>Rallus aquaticus</i> ISEA A-3150/76	2.3	2.2	2.0	3.1
<i>Rallus aquaticus</i> ISEA A-3072/75	2.6	2.8	2.3	3.6
<i>Rallus maculatus</i> ISEA A-5280/94	3.1	2.4	2.4	3.2
<i>Rallus philippensis</i> ISEA A-4054/84	3.0	2.7	2.6	3.6
<i>Rallus limicola</i> ISEA A-3515/78	-	-	2.8	3.1
<i>Rallus aquaticus</i> UCBL 135/1	2.9	2.4	2.4	3.4
<i>Rallus aquaticus</i> UCBL 135/2	2.4	2.2	2.2	4.2
<i>Rallus aquaticus</i> NHM 1982.41.6	2.6	2.4	2.2	3.0
<i>Crex crex</i> UCBL 139 KR/1	2.7	2.1	2.4	3.2
<i>Crex crex</i> ISEA A-1611/65	2.8	2.6	2.4	3.3
<i>Crex crex</i> ISEA A-15150/93	2.7	2.3	2.4	3.3
<i>Crex crex</i> NHM 1930.3.24.59	2.8	2.3	2.3	3.1
<i>Crex crex</i> NHM 1930.3.24.58	2.7	2.1	2.3	3.1
<i>Crex crex</i> NHM 1930.3.24.56	2.8	2.4	2.2	3.4
<i>Gallinula chloropus</i> ISEA A-2317/70	3.8	4.0	2.7	4.4
<i>Gallinula chloropus</i> UCBL 140/3	4.8	3.2	2.8	5.4
<i>Gallinula chloropus</i> UCBL 140/4	3.4	2.8	2.5	4.0
<i>Gallinula ventralis</i> ISEA A-5356/94	3.7	3.1	3.3	3.7
<i>Gallinula melanops</i> NHM 1954.5.4	2.9	2.6	2.3	3.5
<i>Fulica atra</i> ISEA A-1293/63	4.0	3.6	3.4	5.0
<i>Fulica atra</i> UCBL 142/5	3.2	3.5	3.5	4.9
<i>Fulica atra</i> UCBL 142/6	3.9	3.7	3.6	5.6
<i>Laterallus leucopyrrhus</i> NHM 1959.10.4	1.9	1.6	1.6	2.3

Table 1. Continued

Species	Width of the diaphysis in the middle (a)	Thickness of the diaphysis in the middle (b)	Width of tr. m. III (c)	Diameter of tr. m. III (d)
<i>Sarothrura elegans</i> NHM 1997.34.1	1.7	1.6	1.4	2.0
<i>Sarothrura elegans</i> NHM 1997.34.2	1.7	1.4	1.4	2.2
<i>Amaurornis flavirostris</i> NHM 1992.28.3	2.8	2.1	2.1	2.9
<i>Amaurornis flavirostris</i> NHM 1989.19.10	2.6	2.2	2.1	2.8
<i>Amaurornis flavirostris</i> NHM 1966.3.3	2.2	1.8	1.9	2.8
<i>Amaurornis flavirostris</i> NHM 1966.3.4	2.4	2.0	1.9	2.6
<i>Crex egregia</i> NHM 1898.5.12.3	2.3	1.9	2.4	2.8
<i>Canirallus kioloioloides</i> NHM 1897.5.10.28	2.8	2.4	2.7	3.6
<i>Porphyrio aleni</i> NHM 1961.11.1	4.6	3.3	3.0	3.1

¹ Measurements of Jánossy (1991). He writes: “The width ... of the middle trochlea (varies) from to 2,0-2,2 mm.” (p. 22).

REMSSEN, 2013; DEL HOYO, COLLAR 2014). Thus, two of the West Palaearctic crakes were transferred to *Zapornia*: *Z. parva* (Scopoli, 1769) and *Z. pusilla* (Pallas, 1776) in the Zapornini Des Murs 1860 (Old World Crakes), while *P. porzana* has been included in Gallinulini G.R. GRAY 1840 (Coots, True Gallinules and Moorhens).

As stated above, the described fossil species resembles to *Porzana* because of its more laterally protruded lateral edge of the distal diaphysis of tmt. above the epiphysis in the area of tr. m. IV. Size differences between *P. botunensis* sp. n. and the smaller Western-Palaearctic species of genus *Zapornia* (e. g. *Z. parva*, *Z. pusilla*) also drift it far from *Zapornia*.

Dimensionally the specimen falls within the range of *P. porzana* (Table 1) but differs from that species by the more distally positioned inception of trochlea metatarsi II; shallower edges of the condyles of the trochlea metatarsi II; clearly developed edge (linea) between the facies dorsalis and facies subcutanea lateralis; deeper facies lateralis caudalis; relatively wider incissura intertrochlearis lateralis and narrower diaphysis (measurement “d”, Figs. 1, 2); from *Zapornia pusilla*: in the bigger size, thicker diaphysis in its distal half, absence of clear relief on the tr. m. II, less developed relief on tr. m. II and tr. m. IV, wider incissura intertrochlearis lateralis, more proximal position of foramen vasculare distale, and the almost twice wider f. m. I; from *Porzana carolina*: in the considerably smaller size, and the deeper fovea ligamenti collateralis; from *Zapornia fusca*: in the smaller size, shallower relief of the articular surface of tr. m. II and tr. m. IV, and wider incissura intertrochlearis lateralis; from *Zapornia parva*: in the deeper and well-developed socket (f. l. c.) on the tr. m. II, shallower relief of the tr. m. III and tr. m. IV, wider facies dorsalis of the whole distal half of diaphysis, wider diaphysis, flatter surface of facies dorsalis, more graduate but not sharp transition to the



Fig. 3. Distribution of the genus *Porzana/Zapornia* in the Pliocene – Gelasian (MN 14 – MQ 1) of Europe: 1 – Osztamos 9, Hungary (*P. estramosi*); 2 – S'Onix, Mallorca, Balearics, Spain (*P. porzana*); 3 – Beremend 16, Hungary (*P. porzana*); 4 – Voigtstedt, Germany (*P. porzana*); 5 – Stranska skala, Czech Republic (*P. porzana*); 6 – Beremend 17, Hungary (*Z. (P.) parva*); 7 – Stranska skala, Czech Republic (*Porzana* sp.) (1-7 after Mlíkovský, 2002); 8 – Varshets, Bulgaria (*P. botunensis* sp. n.)

condylus medialis of tr. m. III, more asymmetrical tr. m. III, and considerably wider f. m. I.

Thus, the NMNHS 301 find could not be referred to any of the recent species belonging to the genus.

Discussion

GARCIA-R *et al.* (2014) state that in the Miocene and Pliocene Rallidae accomplished an increasing spatial and ecological diversification. Comparison of Nearctic and Palaearctic Regions shows that the faunistic diversity of Rallidae during the Pliocene was considerably greater in North America. FEDUCCIA (1968) summarises for this continent that “a mini-

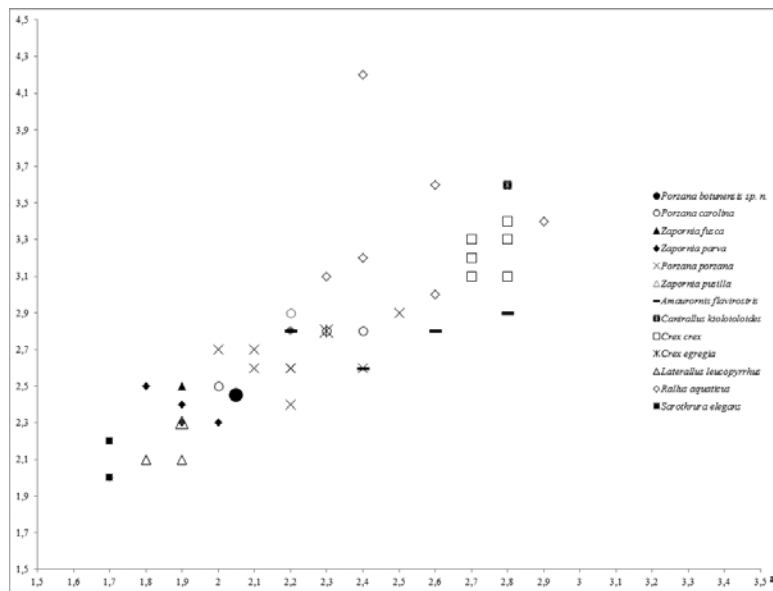


Fig. 4. Correlation between the measurements (in mm) “a” – width of the diaphysis in the middle, and “d” – diameter of tr. m. III in some rallids (Ref. Table 1)

num of 12 species of rallids existed during the Pliocene”, but none of genus *Porzana*. At the same time BOCHEŃSKI (1997) lists data only on one Rallidae species, established in the Pliocene deposits from Europe. Having in mind *Gallinula gigantea* Tchernov, 1980, *Gallinula balcanica* Boev 1999, and *P. botunensis* sp. n., the correlation will be 12:4 for the Pliocene record (now MN 17 is placed in the Early Pleistocene). FEDUCCIA (1968) gives no Pliocene records of genus *Porzana* for North America. It seems that this genus appeared there even in the (?) Pleistocene, while in the Western-Palaeartic deposits it is found much earlier: in the Late Miocene. The Pleistocene record of Rallidae from the Palaeartic includes 14 species (Tyrberg, 1998), while in the Nearctic it consisted of 15 species (FEDUCCIA 1968).

In the recent breeding avifaunas of both Nearctic and Palaeartic Regions the correlation between the species number of Rallids is 11:11 (TAYLOR 1996). According to the same author only one species of the genus *Porzana* is spread in the Nearctic as compared to five species for the Palaeartic Region. Three species are spread in the Eastern Palaeartic and six species in South-Eastern Asia. Hence, we could determine the South-Asian region as a centre of speciation for the genus *Porzana*. Obviously, in Europe, the genus *Porzana* appeared in the Late Miocene, *i.e.* its chronostratigraphical distribution is MN 13 to present. The known fossil taxa (two fossil species and one fossil subspecies) were spread throughout Eastern Europe and all of them came from sites that were located in the hilly landscapes near the running water bodies. The Pliocene – early

Pleistocene record of *Porzana* in Europe is scanty (Fig. 3).

Besides the morphological differences between both species, we consider *Porzana botunensis* sp. n. a possible ancestor or (most probably) a fossil sister species, close to *Porzana porzana*. We should consider that *P. botunensis* sp. n. existed in MNQ 17 zone, while the oldest finds of the closest species, *P. porzana*, originate from the Middle Pleistocene, MNQ 22 zone (TYRBERG 1998). The summary data by this author indicates that no taxa of the genus *Porzana* (incl. *Zapornia* – Z. B.) are known from the European Quaternary before the Middle Pleistocene.

The position of *P. botunensis* sp. n. among other species of the genus *Porzana* (and *Zapornia*) and some other small rallids (Fig. 4) shows that the Varshets specimen lays well in the scope of *P. porzana*, and resembles that of *Z. parva*.

Porzana botunensis sp. n. completes the aquatic/hydrophilous avian complex of the type locality, which so far included *Actitis balcanica* Boev, 1998, *Gallinula balcanica* and *Motacilla* sp. (Boev, 2007).

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References

- BOCHEŃSKI Z. 1997. List of European fossil bird species. – *Acta zool. cracov.*, **40** (2): 293-333.
- BOEV Z. 1995. Varshets (Western Stara Planina – Bulgaria): An example of Middle Villafranchian forest-steppe onithocoenosis. – In: *Ecosystem Evolution. Internatr. Symp., Moscow, 26-30. Sepr. 1995, Palaeontr. Instr., RAS, Abstracts, Moscow, 14.*
- BOEV Z. 1999. Neogene and Quaternary birds (Aves) from Bulgaria. National Museum of Natural History, Bulgarian Academy of Sciences, Sofia. D. Sci. thesis. 243 pp. + 243 pp. supplements.
- BOEV Z. 2007. Neogene avifaunas of Bulgaria (a brief review). – In: BAKARDJIEVA N. STR. CHANKOVA, B. KRASTANOV, SV. GATEVA (Compilers). *Evolution and Ecology – 2007. Union of the Scientists of Bulgaria. 3rd National Seminar. Proceedings, Sofia, 26-35.*
- BOEV Z. 2010. *Gyps bochenskii* sp. n. (Aves: Falconiformes) from the Late Pliocene of Varshets (NW Bulgaria). – *Acta zoologica bulgarica*, **62** (2): 211-242.
- BOEV Z. 2002. Neogene avifauna of Bulgaria. – In: Zhou Z., F. Zhang (Eds.): *Proceedings of the 5th Symposium of the Society of Avian Palaeontology and Evolution, Beijing, 01-04.06.2000. Science Press, Beijing, 29-40.*
- BRODKORB P. 1967. Catalogue of fossil birds: Part 3 (Ralliformes, Ichthyornithiformes, Charadriiformes). – *Bulletin of the Florida State Museum, Biological Sciences*, **11** (3): 99-220.
- CHENEVAL J. 1996. Miocene Avian Localities of France. – In: MLÍKOVSKÝ J. (Ed.). *Tertiary avian localities of Europe. – Acta universitatis Carolinae Geologica. niverzita Karlova, Praha, 39* (1995): 599-611.
- CRACRAFT J. 1973. Systematics and evolution of the Gruiformes (Class Aves). – *Amer. Museum of Natr. Histr., New York*, **151** (1): 1-128.
- DEL HOYO J., N. J. COLLAR 2014. *HBW and BirdLife International Illustrated Checklist of the Birds of the World. Volume 1: Non-passerines. Lynx Edicions, Barcelona, 1-903.*
- DELLE CAVE L. 1996. Tertiary Avian Localities of Italy. – In: MLÍKOVSKÝ J. (ed.). *Tertiary avian localities of Europe. Acta universitatis Carolinae Geologica. niverzita Karlova, Praha, 39* (1995): 665-681.
- DICKINSON E. C., J. V. REMSEN JR. (Eds.) 2013. *The Howard & Moore Complete Checklist of the Birds of the World. 4th Edition, Vol. 1, Aves Press, Eastbourne, U. K. 1-461.*
- FEDUCCIA A. 1968. The Pliocene Rails of North America. – *The Auk*, **85**: 441-453.
- GARCIA-R J. C., G. C. GIBB, S. A. TREWICK 2014. Deep global evolutionary radiation in birds: Diversification and trait evolution in the cosmopolitan bird family Rallidae. – *Molecular Phylogenetics and Evolution*, **81**: 96-108.
- JÁNOSSY D. 1979. Plio-Pleistocene bird remains from the Carpathian Basin. IV. Anseriformes, Gruiformes, Charadriiformes, Passeriformes. – *Aquila*, **85**: 11-39.
- JÁNOSSY D. 1991. Late Miocene bird remains from Polgardi (W Hungary). – *Aquila*, **98**: 13-35.
- KUROCHKIN E. N. 1985. *Birds of Central Asia in the Pliocene. Moscow, Nauka Publ. House, 1-120. (In Russian).*
- MEIN P. 1990. Updating of MN zones. – In: LINDSAY E. H., V. FAHLBUSCH P. MEIN (Eds.): *European Neogene mammal chronology. New York. Plenum Press, 73-90.*
- MLÍKOVSKÝ J. 1996a. Tertiary avian localities of Ukraine. – In: MLÍKOVSKÝ J. (Ed.): *Tertiary avian localities of Europe. Acta universitatis Carolinae Geologica. niverzita Karlova, Praha, 39* (1995): 743-756.
- MLÍKOVSKÝ J. 1996b. Tertiary avian localities of the Czech Republic. – In: Mlíkovský, J. (Ed.). *Tertiary avian localities of Europe. Acta universitatis Carolinae Geologica. Univerzita Karlova, Praha, 39* (1995): 551-557.
- MLÍKOVSKÝ J. 1996c (ed.) *Tertiary avian localities of Europe. Acta universitatis Carolinae Geologica. Univerzita Karlova, Praha, 39* (1995): 519-852.
- MLÍKOVSKÝ J., 2002. *Cenozoic Birds of the World. Part 1: Europe. Praha: Ninox Press, 1-406.*
- MOURER-CHAUVIRE' C. 1996. Paleogene Avian Localities of France. – In: MLÍKOVSKÝ J. (Ed.): *Tertiary Avian Localities of Europe. Acta universitatis Carolinae Geologica. Univerzita Karlova, Praha, 39* (1995): 567-598.
- OLSON S. L. 1973. Evolution of the rails of the south Atlantic Islands (Aves: Rallidae). – *Smithsonian Contributions to Zoology*, **152**: 1-53
- OLSON S. L. 1977. A Synopsis of the Fossil Rallidae. – In: S. Dillon Ripley: *Rails of the World. D. R. Godin, Boston-Massachusetts, 339-380.*
- OLSON S. L. 1985. The fossil record of birds. – In: KING J. R., D. C. PARKER (Eds.): *Avian Biology, Vol. VIII, Academic Press, New York, 79-252.*
- OLSON S. L., H. F. JAMES 1991. Descriptions of thirty-two new species of birds from the Hawaiian Islands: Part I. Non-Passeriformes. – *Ornithological Monographs, The American Ornithologists' Union, Washington D.C., 45.*
- DE PIETRI V.L., G. MAYR 2014. Reappraisal of early Miocene rails (Aves, Rallidae) from central France: diversity and character evolution. – *Journal of Zoological Systematics and Evolutionary Research*, **52** (4): 312-322.
- POPOV V. V. 2001. Late Pliocene voles (Mammalia: Arvicolidae) from Varshets (North Bulgaria). – *Acta zoologica cracoviensia*, **44** (2): 143-172.
- SPASSOV N. 1997. Varshets and Slivnitsa – new localities of Villafranchian vertebrate fauna from Bulgaria (taxonomic composition, biostratigraphy and climatochronology). – *Geologica Balcanica*, **27** (1-2): 83-90.
- STEADMAN D. W. 1986. Two new species of rails (Aves: Rallidae) from Mangaia, southern Cook Islands. – *Pacific Science*, **40**: (1-4): 27-43.
- TAYLOR P. B. 1996. Family Rallidae (Rails, Galltules and Coots). – In: DEL HOYO, J., A. ELLIOT, J. SARGATAL (Eds.): 1996. *Handbook of the Birds of the World, Vol. 3. Hoatzin to Auks. Lynx Edicions, Barcelona, 108-209.*
- TYRBERG TR. 1998. *Pleistocene Birds of the Palearctic: A Catalogue. – Publ. of the Nuttall Ornithol. Club, No 27. Cambridge, Massachusetts, 1-720.*

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