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Gallinula balcanica sp. n. (Rallidae: Gruiformes) – a middle villafranchian moorhen from Western Bulgaria

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A b s t r a c t. A new fossil species of g. *Gallinula* is described on the basis of a complete ulna, originated from the Middle Villafranchian site (MN 17) of Varshets (Western Bulgaria).

K e y w o r d s: fossil Rallidae, Late Pliocene avifaunas, paleornithology, evolution of birds, Balkan palaeoavifauna

The site and the recovered avifauna

The Middle Villafranchian site near the town of Varshets (Western Bulgaria) has provided over of 120 vertebrate taxa, at least 51 of them are birds (B o e v, 1992, 1995 a, b; N. Spassov, V. Popov - unpubl. data). The site is the type locality of *Lagopus balcanicus* Boev, 1995 b and *Chauvireria balcanica* Boev, 1997 and several other avian taxa.

Most of the bird taxa belong to seven orders and are still not completely identified: Falconiformes (8 taxa), Galliformes (6), Gruiformes (3), Columbiformes (1), Charadriiformes (1), Apodiformes (1), and Passeriformes (31 to 37).

Chauvireria balcanica is the absolute dominant in the site. It makes up 85 % of all avian finds collected up to now from the site. A short description of the site is given by B o e v (1995 b).

Geographical and stratigraphical distribution of *Gallinula chloropus* (L.) in Europe - the only recent European Moorhen

In Europe, *G. chloropus*, is partly resident, partly migrant in Boreal to Subtropical zones. It occurs in small pools and ditches, rivers and lakes. This species prefers thick waterside vegetation. The 0°C January isotherm is the limit of its distribution (H a r r i s o n, 1982). The moorhen is the most arboreal of the West Palearctic Rallids. It is a lowland species, often up to 500 m a.s.l.

The Moorhen is a widespread ancient species which colonized the Tropical and the Temperate zones along the coasts of Tethys since the Neogene (V o i n s t v e n s k i y, 1960). It is considered an ancient inhabitant in the flooded landscapes in Europe. After the Pleistocene glaciations it has appeared northwards and soutwestwards along the river vallies, lakes, marshlands and other wetlands (V o i n s t v e n k i y, 1960).

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The fossil record of *G. chloropus* includes numerous Pleistocene finds from Ireland, England, Denmark, France, Monaco, Hungary, Italy, former Czechoslovakia, Palestine, California, Arizona, Illinois, Florida, Cuba, Venezuela, Brazil (B r o d k o r b, 1967). The finds of the Early Pleistocene come from Israel, Romania and Spain, those from the Middle Pleistocene come from Germany, Czechia, France, Israel and Italy, and the finds from the Late Pleistocene come from Austria, Belgium, Germany, China, Czechia, France, Georgia, Grece, Hungary, Ireland, Italy, Poland, Romania, Slovakia, United Kingdom and Ukraine. In addition, fossil finds of this species are reported for the final of the Late Pliocene of Tanzania (T y r b e r g, 1998).

Twelve recent (d e l H o y o et al., 1996) and one fossil (O l s o n, 1993) subspecies of *G. chloropus* are recognized. Only one subspecies, *G. chloropus chloropus*, is spread throughout the mainland of Europe (H o w a r d & M o o r e, 1980).

Fossil species of g. *Gallinula*

Finds of *Gallinula* are reported from the Early Pliocene (MN 15) site of Csarnota 2 in Hungary. No other Tertiary finds (except these of Tanzania, see above) are reported up to now (M l i k o v s k y, 1996). Only one fossil species of this genus, *Gallinula gigantea* Tchernow, 1980, is recognized from the Early Pleistocene from Israel (MNQ 19) and from the Middle Pleisocene (MNQ 21) from Czechia (T y r b e r g, 1998). In his Synopsis of the Fossil Rallidae Olson (1977), lists as valid 4 fossil taxa: *Gallinula kansarum* Brodkorb, 1967 (humerus dist sin., Uppper Pliocene of Kanzas), *Gallinula chloropus brodkorbi* (M c C o y, 1963) (humerus dex., Upper Pleistocene of Florida), *Gallinula mortierii reperta* (D e V i s, 1888) (tmt dex., Late Pliocene or Early Pleistocene of Quinsland, Australia) and Gallinula hodgeni (S c a r l e t t, 1955) (pelvis, Quaternary of New Zealand – a flightless form).

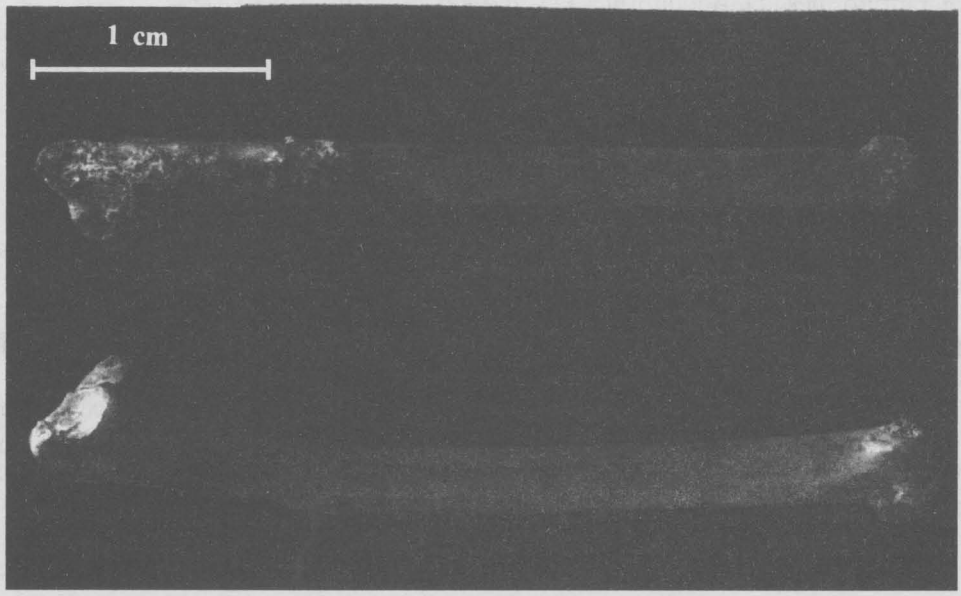

Fig. 1. *Gallinula balcanica* sp. n. (ulna sin.) - holotype, dorsal and ventral views (National Museum of Natural History, Sofia, Coll. No. 112).

Gallinula balcanica sp. n.

H o l o t y p e: Complete ulna sin. (Fig. 1). Collections of the Fossil and Recent Birds Department of the National Museum of Natural History, Bulgarian Academy of Sciences, cat. № 112. Collected in May 1992 by Z. Boev.

L o c a l i t y: A ponor in a rocky hill, 6 km NNE of Varshets (43 13 N, 23 17 E).

H o r i z o n: Unconsolidated, unstratified sediments accumulated in the filling of clay terra-rossa. The fossil bones are broken, sometimes making a kind of bone breccia.

T a b l e 1. Measurements of ulna of fossil and recent *Gallinula**

Species	*a*	*b*	*c*	*d*	*e*	*f*	*g*	c.100/g
Fossil								
Gallinula balcanica sp. n. NMNHS 112	6.2	4.8	4.8	2.4	4.45	3.3	38.1	12.59
Recent								
G. chloropus UCBL 140/1	6.7	5.25	5.65	2.9	5.1	4.1	41.4	13.64
G. chloropus UCBL 140/2	6.5	5.0	5.5	2.5	4.7	3.6	41.4	13.28
G. chloropus UCBL 140/4	5.9	4.7	5.0	2.6	4.3	3.7	39.8	12.56
G. chloropus UCBL 140/5	6.3	4.8	5.1	2.9	4.6	3.9	39.4	12.94
G. chloropus UCBL 140/6	-	-	-	3.0	4.8	3.9	-	-
G. chloropus NMNHS 3/1983	6.3	4.8	5.25	2.4	4.5	4.3	41.6	12.62
G. chloropus NMNHS 4/1983	6.0	4.25	4.7	2.6	4.2	4.1	37.4	12.56
G. chloropus NMNHS 10/1990	6.3	5.15	5.0	2.75	-	-	-	-
G. chloropus NMNHS 11/1990	6.0	5.6	4.7	2.6	4.2	3.9	38.4	12.23
Crex crex NMNHS 1/1986	5.2	4.1	4.0	2.3	3.6	3.9	41.2	9.70
Fulica atra UCBL 142/6	8.6	6.6	7.4	4.9	6.5	4.7	68.2	10.85
F. atra NMNHS 9/1986	9.0	6.9	7.7	4.8	6.2	5.7	68.5	11.24
F. atra NMNHS 15/1989	8.5	6.4	7.1	3.4	5.6	5.2	64.6	10.99
F. atra NMNHS 16/1989	8.6	6.6	7.3	3.8	6.2	5.7	65.9	11.07
F. atra NMNHS 18/1991	8.4	6.7	7.2	3.7	5.6	5.5	62.9	11.44
Porzana porzana NMNHS 1/1989	4.1	3.2	3.15	1.65	3.0	2.9	29.2	11.25
P. porzana UCBL 136/3	4.9	3.0	3.15	1.7	3.0	2.4	28.0	11.25
Rallus aquaticus NMNHS 1/1990	4.9	3.8	3.7	2.0	3.5	3.1	33.5	11.04
R. aquaticus NMNHS 2/1990	4.6	3.6	3.3	1.7	3.3	3.1	31.2	10.57
R. aquaticus NMNHS 4/1994	4.5	3.5	3.2	1.95	3.3	3.0	31.3	10.22
R. aquaticus NMNHS 3/1993	4.6	3.4	3.35	1.8	3.2	3.0	31.7	10.56

*The manner of measurings is given on Fig. 2.

C h r o n o s t r a t i g r a p h y: Middle Villafranchian. The associated fauna of mammals (S p a s s o v, 1995; V. Popov - pers. comm.) attributes the site to the MN 17 zone according to the chronostratigraphical system of M e i n (1990).

E t y m o l o g y: The name "*balcanica*" is given after the "Balkan Range" - the main mountain chain of the Balkan peninsula.

M e a s u r e m e n t s: see Table 1.

C o m p a r i s o n: The general shape of the bone suggests an ulna of Rallidae species of medium size. Dimensionally and morphologically *Gallinula balcanica* sp. n. is very close to the recent Moorhen species *G. chloropus*. *Porzana* and *Rallus* are much

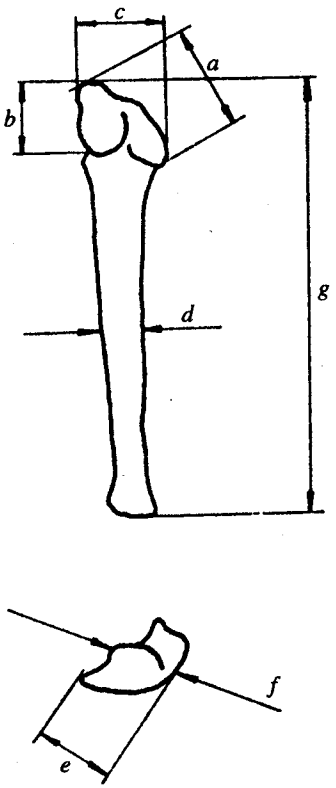

Fig. 2. The manner of measurements of the ulna of *Gallinula*

smaller, while *Fulica* and *Porphyrio* are bigger than compared specimen. It differs from *Crex crex* by the shorter and thicker diaphysis and bigger epiphyses (Table 1). In comparison with *Porphyrula aleni* (T h o m s o n, 1842), *G. chloropus* is bigger: wing length 141-164 and 169-194 mm respectively (C r a m p , S i m m o n s, 1980). The Pleistocene *G. gigantea* was "very large, ... but still smaller than *Fulica*." (T c h e r n o v, 1980). The holotype of this species is a proximal humerus. Thus, besides the considerable differences in size, the absence of homologous skeletal elements does not allow to refer the find from Varshets to this taxon. As it is mentioned by T c h e r n o v (1980), *G. gigantea* was both metrically and morphologically different from the African lesser moorhen *G. angulata*, and the Allen's gallinule *Porhyrula alleni*. As seen from the review above, the Bulgarian find cannot be refered to any of the described fossil taxa.

D i a g n o s i s: A Late Pliocene Mooohen which in comparison with the recent *G. chloropus* has: higher and better marked in proximal part ventral edge of the depresio m. brachialis, shorter condylus dorsalis, smaller labrum condyli and tuberculum carpale, wider processus cotylaris dorsalis, more angular medial edge of cotyla ventralis, shallower sulcus tendineus of distal epiphysis, less developed tuberculum bicipitale in lateral view, and a constricted arc of condylus dorsalis.

C o l l e c t i o n s a c r o n y m s: NMNHS - National Museum of Natural History - Sofia; UCBL - Centre des Sciences de la Terre at the Universite' Claude Bernard - Lyon 1.

C o m p a r a t i v e m a t e r i a l e x a m i n e d: The find from Varshets was compared with skeletons of the following species: UCBL: *Gallinula chloropus* - 140/1, 140/2, 140/5, 140/6, 140/7; *Fulica atra* - 142/6; *Porzana porzana* - 136/3; *Crex crex* - KR/1; *Rallus aquaticus* - 135/1; NMNHS: *Gallinula chloropus* - 4/1983, 3/1983, 10/1990, 11/1990; *Fulica atra* - 9/1986, 15/1989, 16/1989, 18/1991, *Rallus aquaticus* - 1/1990, 2/1990, 3/1993, 4/1994; *Crex crex* - 1/1986, *Porzana porzana* - 1/1989.

D i s c u s s i o n: As O l s o n (1977) writes, *G. mortierii reperta* (De V i s, 1888) was flightless and "Evidently ... evolved on the mainland ...(i.e. Australia)". For *G. ch. brodkorbi* Olson suggests a species separation because of its larger size in comparison with the recent *G. chloropus*. *G. kansarum* is considered an ancestral form of modern Moorhen (F e d u c c i a, 1968; O l s o n, 1977). The total lenght of the ulna, measured by Brodkorb (1967), is 46,8, width through condyles - 5,6, and width of shaft - 4,5 mm. He writes that this ulna "...is referred only tentatively" to *G. kansarum*. In any way, the metrical differences are considerable (see Table 1) to refer the Bulgarian find to *G. kansarum*. No other species of *Gallinula* are known up to now. *Gallinula stenuipes* De

V i s, 1888 and *G. perelata* De V i s, 1892, listed by B r o d k o r b (1967) are not considered taxa of that genus (O l s o n, 1985, 1993). Fig. 25 on p. 370 in O l s o n (1977) for the ulna of *G. hodgeni* shows a clear morphological difference with the bone of *G. balcanica* sp. n. The flightless *G. hodgeni* has a rudimental ulna.

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Gallinula balcanica sp. n. (Rallidae - Gruiformes) - зеленоножка от средния вилафранк в Западна България

Златозар Н. Боев

(Р е з ю м е)

Холотип: цяла лакътна кост (ulna).

Находище: Вършец - на 6 km ССИ от града в подножието на Западна Стара планина.

Възраст: Среден вилафранк (MN зона 17; ок. 2,3 млн. г.).

Размери (в mm): обща дължина на костта - 38,1; ширина на проксималната епифиза - 4,8; ширина в средата на диафизата - 2,4; ширина на condylus dorsalis - 4,45.

Диагноза: Късноплиоценски вид от р. *Gallinula*, който в сравнение с рецентния номинатен вид *G. chloropus*, има: по-висок и по-добре оформен в проксималната си част вентрален ръб на depresio m. brachialis; по-къс condylus dorsalis; по-малки labrum condyli и tuberculum carpale; по-висок processus cotylaris dorsalis; по-ъгловат медиален ръб на cotyla ventralis; по-плитка sulcus tendineus на дисталната епифиза; по-развит tuberculum bicipitale в латерален изглед и прищипната дъга на condylus dorsalis.