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The Presence of *Apus baranensis* Janossy, 1977, (Aves: Apodidae) in the Late Pliocene of Bulgaria

Zlatozar Boev[*]

Abstract: Nine bones of the wing (5 carpometacarpi, 2 humeri, and 2 ulnae) of at least 5 individuals were collected from the Middle Villafranchian site near Varshets (W Bulgaria), dated MN 17 zone. The carpometacarpal bone is a new skeletal element, unknown up to now for *Apus baranensis*. Its processus extensorius and the tuberculum dorsale of crista pectoralis humeri are relatively longer than that of the other related species of the genus (i.e. *A. apus* and *A. melba*). Detailed bone measurements are provided for humerus, ulna and carpometacarpus. The means of the total lengths (in mm) of these bones are: humerus - 9,4 (n=3); ulna - 12,9 (n=3), and carpometacarpus - 15,3 (n=4). The new site is 480 km SE from the type-locality of Beremend and marks a southeastern distribution of this species in Europe. The site of Varshets is the first confirmation of the species' existence up to now, after its description in 1977 from Southern Hungary.

Key words: Swifts, Fossil birds, Paleornithology, Pliocene fauna, Balkans, SE European Tertiary avifauna

A Brief Review of the Fossil Record of Apodidae

The fossil record of Apodiformes is scarce. According to Brodkorb (1971), Janossy (1977) and Olson (1993) all known Tertiary paleospecies originate from Eocene and Miocene deposits. *Cypselavus gallicus* Gaillard, 1908, was described from Upper Eocene or Lower Oligocene of France, while *Cypselavus intermedius* Gaillard, 1938, and *Apus ignotus* (Milne-Edwards, 1871) came from Lower Miocene of France. *Apus gaillardi* (Ennouchi, 1930) is known from Upper Middle Miocene, and *Collocalia incerta* Milne-Edwards, 1871 - from Lower Miocene, both from France.

Olson (1982) described also a new species of Palm swift (*Tachornis uranoceles* Olson, 1982) from the Pleistocene of Puerto Rico. Brodkorb (1971) lists many Pleistocene and prehistoric sites of the following neospecies: *Streptoprocne zonaris* (Shaw), *Apus melba* (Linnaeus, 1758), *Apus apus* (Linnaeus, 1758), *Apus affinis* (J. E. Gray, 1832), and *Aeronautes saxatalis* (Woodhouse), most of them in their recent ranges.

Following Collins' (1976) revision, Olson (1985) assumed that *A. ignotus*, *C. incerta* and *C. intermedius* might be considered a single species *Cypseloides ignotus* (Millne-Edwards) = *Procypseloides ignotus* Harrison (1984) and that the Apodidae originated in the Early Miocene. At present the subfamily Cypseloidinae only occurs in the New World and its "European" history is of considerable interest. Subsequently, Mlikovsky (1989) described *Cypseloides mourerchauvireae* Mlikovsky, 1989, from the late Eocene of France. Thus the Cypseloidinae is now being represented by two paleospecies in Tertiary European avifauna.

Olson (1985) considered valid two other species in the genus *Apus*, both from

*National Museum of Natural History, Bulgarian Academy of Sciences, 1, Tsar Osvoboditel Blvd., 1000 Sofia, Bulgaria, E-mail: nmnhz@bgcict.acad.bg

Middle to Late Miocene: *A. gaillardi* (Ennouchi, 1930) from France and *A. wetmorei* (Ballmann, 1976) from Italy. Another interesting record is that of *Chaetura baconica* Janossy, 1977. It was identified from the Late Miocene (MN 11-12) in Central Europe (Hungary), although the genus *Chaetura* at present has Neotropical distribution.

Four other paleotaxa were described from Europe - *Apus submelba* Janossy, 1972, from the Middle Pleistocene (Biharian) of Slovakia, *Apus apus palapus* Janossy, 1974, from the Middle Pleistocene of Hungary, and *Apus baranensis* Janossy, 1977 - from the Late Pliocene (MN 16) of Hungary.

A new family of swifts (Jungornithidae) with two new Paleogene genera and two species, *Jungornis tesselatus* Karkhu, 1988, and *Palescyvus escampensis* Karkhu, 1988, were described by Karkhu (1988). He also considered the Aegialornithinae to be a subfamily of the Hemiprocnidae. So, the Middle Eocene species *Aegialornis szarskii* Peters, 1985, is attributed to the swifts also. At the same time Harrison described two

Table 1. Comparison of measurements (ref. to Fig. 3a) of carpometacarpus of fossil (Varshets - Bulgaria) and recent (France and Bulgaria) *Apus.*

Species	a	b	c	d	e	f
Fossil (Varshets - Bulgaria)						
Apus baranensis - NMNHS 15	2,1	1,7	15,2	2,3	5,0	14,3
Apus baranensis - NMNHS 16	2,1	1,7	15,7	2,4	4,8	14,3
Apus baranensis - NMNHS 17	-	1,8	15,7	2,4	-	ca.14,4
Apus baranensis - NMNHS 18	2,2	1,8	-	-	4,8	-
Apus baranensis - NMNHS 19	2,2	1,75	15,0	2,4	4,7	14,2
Recent (France)						
Apus apus - UCBL 261/3	2,8	2,2	20,8	2,7	5,6	15,4
Apus apus - UCBL 261/14	2,5	2,1	19,7	2,6	5,2	19,0
Apus apus - UCBL 261/6	2,7	2,2	20,7	3,3	5,8	19,5
Apus apus - UCBL 261/13	2,6	2,3	20,3	3,1	5,8	19,1
Apus apus - UCBL 261/8	2,9	2,5	20,2	3,0	5,8	18,9
Apus apus - UCBL 261/2	2,8	2,2	20,0	2,9	6,0	18,7
Apus apus - UCBL 261/5	2,9	2,3	20,9	3,0	5,6	19,7
Apus apus - UCBL 261/9	3,0	2,3	20,8	3,0	6,0	19,4
Apus apus - UCBL 261/15	2,7	2,1	20,6	2,7	5,7	19,4
Apus apus - UCBL 261/16	2,7	2,4	20,6	2,6	5,6	19,3
Apus melba - UCBL 263/2	3,9	3,0	26,4	4,2	8,2	25,3
Recent (Bulgaria)						
Apus melba - NMNHS 1/1988	3,85	3,2	26,4	4,0	7,9	24,9
Apus melba - NMNHS 3/1993	-	-	c.25,5	3,6	-	-

Table 2. Comparison of measurements (ref. to Fig. 3b) of ulna of fossil (Varshets - Bulgaria, Beremend - Hungary and Stranska Skala - Slovakia) and recent (France and Bulgaria) *Apus.*

Species	a	b	c	d	e	f	g	h
Fossil (Varshets - Bulgaria)								
Apus baranensis NMNHS 20	3,7	3,2	2,0	12,9	1,8	2,2	2,6	2,5
Apus baranensis NMNHS 21	3,5	-	2,0	c.12,8	1,7	2,0	2,6	2,4
Fossil (Beremend - Hungary)								
*Apus baranensis**	-	-	-	13,0	1,8	-	-	-
Fossil (Stranska Skala -Slovakia)								
*Apus submelba***	-	-		26,4	-	-	-	-
*Apus submelba***	-	-		25,4	-	-	-	-
*Apus submelba***	-	-	-	25,2	-	-	-	-
*Apus submelba***	-	-	-	25,0	-	-	-	-
Recent (France)								
Apus apus UCBL 261/2	4,6	3,9	2,7	19,0	2,2	2,6	3,5	3,2
Apus apus UCBL 261/3	4,6	3,9	2,7	19,0	2,2	2,6	3,5	3,2
Apus apus UCBL 261/5	4,6	4,0	2,6	18,8	2,2	2,6	3,5	3,1
Apus apus UCBL 261/6	4,6	3,7	2,5	19,2	2,3	2,6	3,5	3,1
Apus apus UCBL 261/8	4,5	3,0	2,4	18,6	2,4	2,6	3,4	3,2
Apus apus UCBL 261/9	4,6	3,8	2,9	19,0	2,1	2,7	3,6	3,3
A. apus UCBL 261/13	4,5	3,7	2,4	18,2	2,2	2,5	3,2	3,0
A. apus - UCBL 261/14	3,9	3,4	2,2	18,0	2,0	2,3	2,8	-
A. apus - UCBL 261/15	4,3	3,4	2,5	18,6	2,2	2,4	3,2	2,9
A. apus - UCBL 261/16	4,5	3,7	2,6	18,7	2,2	2,4	3,2	2,9
A. melba - UCBL 263/2	6,2	5,0	3,7	26,2	3,2	3,5	4,6	4,0
Recent (Bulgaria)								
Apus melba - NMNHS 1/1988	6,1	5,3	3,5	25,7	3,0	3,25	4,4	4,3
A. melba - NMNHS 3/1993	-	5,2	-	25,7	2,7	-	4,2	3,8

* Measurements by Janossy (1977).
** Measurements by Janossy (1972).

new lower Eocene genera, *Scaniacypselus* and *Eocypselus* (Eocypselidae). Except genus *Aegialornis*, the family Hemiprocnidae also includes *Primapus* and *Cypselavus* (Karkhu, 1992). *Primapus lacki* Harrison, Walker, 1975, was established in the early Eocene deposits of Britain and later it was referred to Aegialornithidae by Harrison (1984).

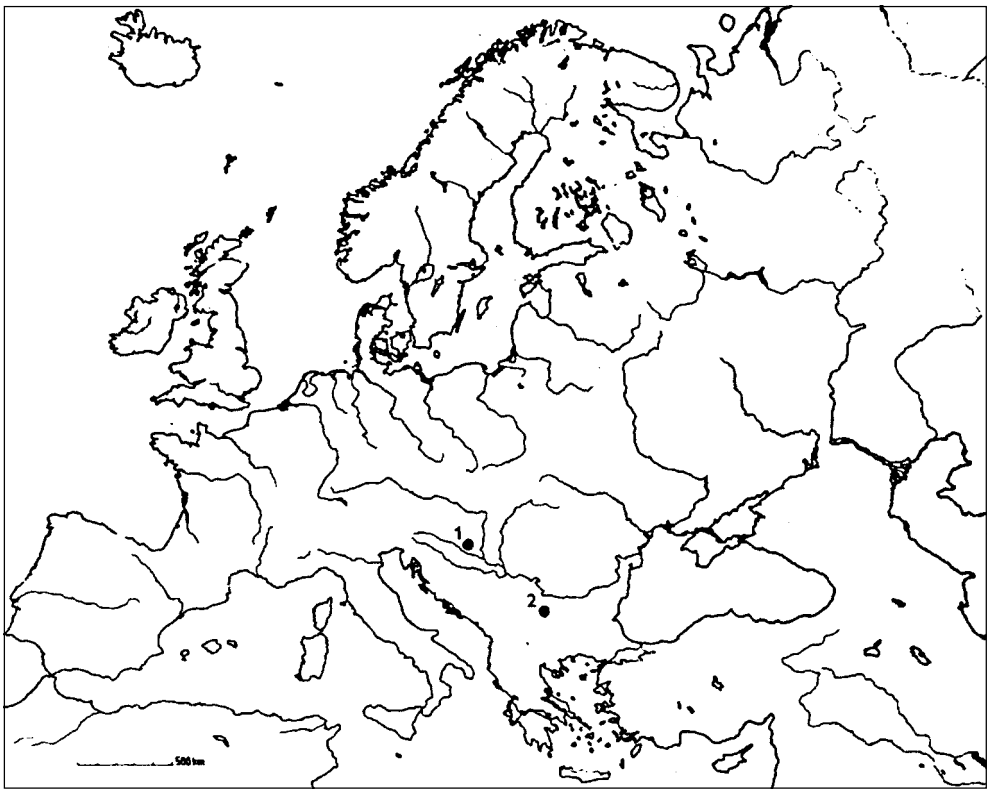

Fig. 1. Geographical distribution of *Apus baranensis*: 1 - locality of Beremend in S Hungary; 2 - locality of Varshets in W Bulgaria (drawing: Vera Hristova).

Hungarian Finds of *Apus baranensis*

Apus baranensis was described from a complete left ulna, coming from the Lowest Pleistocene, Lower Villanyian, Lower Villafranchian (Janossy, 1977, p. 24). The species diagnosis indicates it to be "the hitherto known smallest member of the genus". This ulna and an incomplete right humerus are the only finds until now. They originate from Beremend 5 near the town of Mohach in Southern Hungary (Fig. 1).

The measurements of the two finds from Hungary are given on Table 1, 2; the approximate wing length, calculated by Janossy (1977), would be 115-125 mm.

Bulgarian Finds of *Apus baranensis*

Between July 1990 and September 1993 a total of nine wing bones of *Apus baranensis* were collected from Varshets (Western Balkan Range; Fig. 1) in Western Bulgaria. Most of them were complete. The age of the site was determined to be Middle Villafranchian. The associated fauna of mammals attributes the site to the MN 17 zone (Spassov, 1995; V. Popov, pers. comm.). The locality is a ponor (rock chimney) in a rocky hill, 6 km NNE of the town of Varshets (43 13 N, 23 17 E). The finds were included in unconsolidated, unstratified sediments accumulated in the filling of terra-

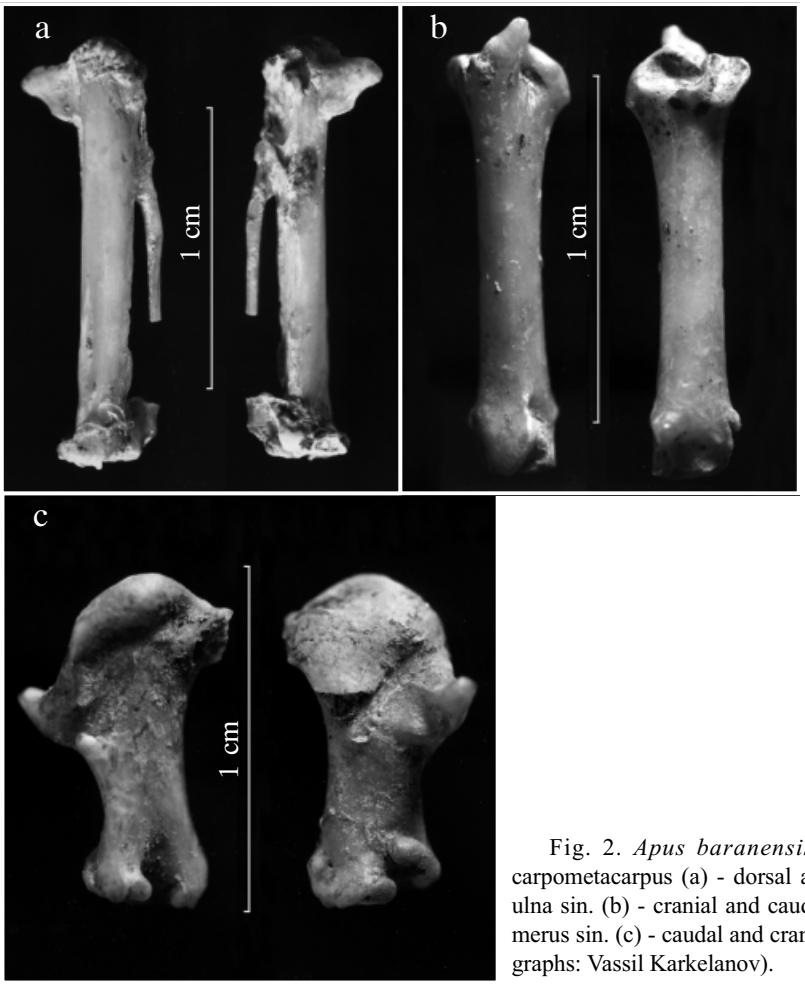

Fig. 2. *Apus baranensis* Janossy, 1977: carpometacarpus (a) - dorsal and ventral aspect; ulna sin. (b) - cranial and caudal aspect, and humerus sin. (c) - caudal and cranial surface (photographs: Vassil Karkelanov).

rossa. Most of the bones of other fossil vertebrates are broken, sometimes making a kind of bone breccia. The total number of species is over 120 (N. Spassov, V. Popov and Z. Boev, unpubl.). Over 71 bird taxa are represented and their generic allocation indicates a forest-steppe landscape (Boev, 1995a). The site is the type-locality of *Lagopus balcanicus* (Boev, 1995b), *Actitis balcanica* (Boev, 1998), ets.

The finds of *Apus baranensis* from Bulgaria include: carpometacarpi: sin., cat. N NMNHS 15 (Fig. 2-a); dex., NMNHS 16; dex., NMNHS 17; dex., NMNHS 18; dex. prox., NMNHS 19; ulnae: sin., NMNHS 20 (Fig. 2-b), sin., NMNHS 21; humeri: sin., NMNHS 22 (Fig. 2-c), dex., NMNHS 23. The finds were collected by the author and are kept in the collections of the Fossil and Recent Birds Department of the National Museum of Natural History, Bulgarian Academy of Sciences (Sofia).

Results and Discussion

As seen from the tables 1-4, *A. baranensis* was of similar size of other *Apus* species and more exactly - of *Apus affinis*. (Table 3-4; the manner of measurement is given on Fig. 3).

Table 3. Comparison of measurements (ref. to fig. 3c) of humerus of fossil (Varshets - Bulgaria and Beremend - Hungary) and recent (France and Bulgaria) *Apus*

Species	a	b	c	d	e	f	g
Fossil (Varshets - Bulgaria)							
Apus baranensis NMNHS 22	9,0	8,6	1,7	ca.6,0	2,9	3,6	ca.5,8
Apus baranensis NMNHS 23	9,7	9,2	1,6	6,6	3,0	3,9	6,0
Fossil (Beremend - Hungary)							
*Apus baranensis**	9,5	-	-	-	-	3,8	-
Recent (France)							
Apus apus UCBL 261/2	11,9	11,4	1,9	7,8	3,8	5,1	7,7
Apus apus UCBL 261/3	12,2	11,6	2,1	8,3	3,9	5,3	8,0
Apus apus UCBL 261/5	12,4	11,8	2,0	8,4	3,5	5,1	7,8
Apus apus UCBL 261/6	12,3	11,5	1,9	8,1	3,7	5,2	7,8
Apus apus UCBL 261/8	12,1	11,2	2,0	7,5	3,9	5,2	7,8
Apus apus UCBL 261/9	12,6	11,8	2,0	8,0	3,8	5,1	8,0
Apus apus UCBL 261/13	12,2	11,5	1,8	7,9	3,6	5,1	7,6
Apus apus UCBL 261/14	11,5	10,8	1,6	6,6	3,0	3,9	6,0
Apus melba UCBL 263/2	17,0	16,2	2,6	11,4	5,3	7,0	11,0
Recent (Bulgaria)							
Apus melba NMNHS 1/1988	17,5	1,2	2,8	c.11,5	5,1	6,9	10,6
Apus melba NMNHS 3/1993	-	-	2,5	-	4,6	-	c.10,2
Recent (other countries)							
Apus horus CSUUB 6383	11,0	9,8	1,6	6,7	3,6	4,8	6,5
Apus affinis AMNH 6563	9,9	9,0	1,5	6,6	3,0	4,0	6,5
Cypsiurus parvus AMNH 6566	7,2	7,1	1,2	5,0	2,2	3,0	4,6

*Measurements by Janossy (1977).

Carpometacarpus: *A. baranensis* differs from *A. apus* and *A. melba* not only dimensionally, but also by the shape and relative size of the processus extensorius. It is more elongated than in *A. apus* and *A. melba*. We consider it a morphological compensation for the smaller size (shortened lengths) of the long bones of the wings of *A. baranensis*.

Ulna: Besides smaller size, it has bigger ventral inclination of olecranon ulnae in comparison with *A. apus* and *A. melba*. It differs metrically from the other fossil swifts of Europe. The total length of the ulna of *Chaetura baconica* (measurements of Janossy, 1977) is 18,3 mm, while that of *A. baranensis* is 12,7 mm. As Janossy (1972) mentioned in the diagnosis, *A. submelba* (his measurements) was a large swift of *A. melba* group, with robust epiphyses. Dimensionally and morphologically the Varshets specimens can be undoubtedly attributed to *Apus baranensis* Janossy, 1977 (Table 2).

Table 4. Correlation between bone and body measurements in Palearctic swifts (adult males and females)

Species	Total length of the bone (mm)			Length of the wing (mm)*	Body mass (g)*
	humerus	ulna	carpometa-carpus		
Recent					
Hirundapus caudacutus				184-218	101-140
A. melba	17,3	25,9	26,1	214-240	76-125
A. pallidus	-	-	-	161-180	30-43,9
A. apus	12,2	18,8	20,5	164-180	26-56
A. alexandri	-	-	-	139-141	-
A. unicolor	-	-	-	150-158	-
A. pacificus	-	-	-	176-186	33-50
A. cafer	-	-	-	135-145	18-28
A. cafer AMNH 6561****	9,9	14,7	16,7		
A. affinis	-	-	-	126-141	21-35
A. affinis AMNH 6563****	9,9	15,1	16,7		
Cypsiurus parvus	-	-	-	128-138	10-18
C. parvus AMNH 6566****	7,2	11,1	13,3	-	-
Fossil					
*A. baranensis***	9,4	12,9	15,3	115-125***	

* After Cramp et al. (1989).
** Means of measurements of the finds from Hungary and Bulgaria.
*** Estimation by Janossy (1977).
**** Measurements by Dr. Ch. Collins.

Humerus: The typical sharp processus (tuberculum dorsale) of crista pectoralis of *A. baranensis* is much sharper and relatively longer than that of *A. apus* and *A. melba* - another morphological compensation. Other elements of humerus display high morphological homogeneity of genus *Apus.* It is very demonstrative in humeral bones of the three species compared.

We do not compare the finds from Varshets with other genera of fossil swifts because of the considerable chronostratigrafical, dimensional and chorological differences.

Collections' acronyms: AMNH - American Museum of Natural History - New York; NMNHS - National Museum of Natural History - Sofia; UCBL - Centre des Sciences de la Tèrre at the Université Claude Bernard - Lyon.

Comparative material examined: fossils from Varshets were compared with skeletons of the following species: NMNHS: *Apus melba*: NN 1/1988; 3/1993; UCBL: *Apus apus*: NN 261/2; 261/3; 261/5; 261/6; 261/8; 261/9; 261/13; 261/14; 261/15; 261/16; *Apus melba*: 263/2.

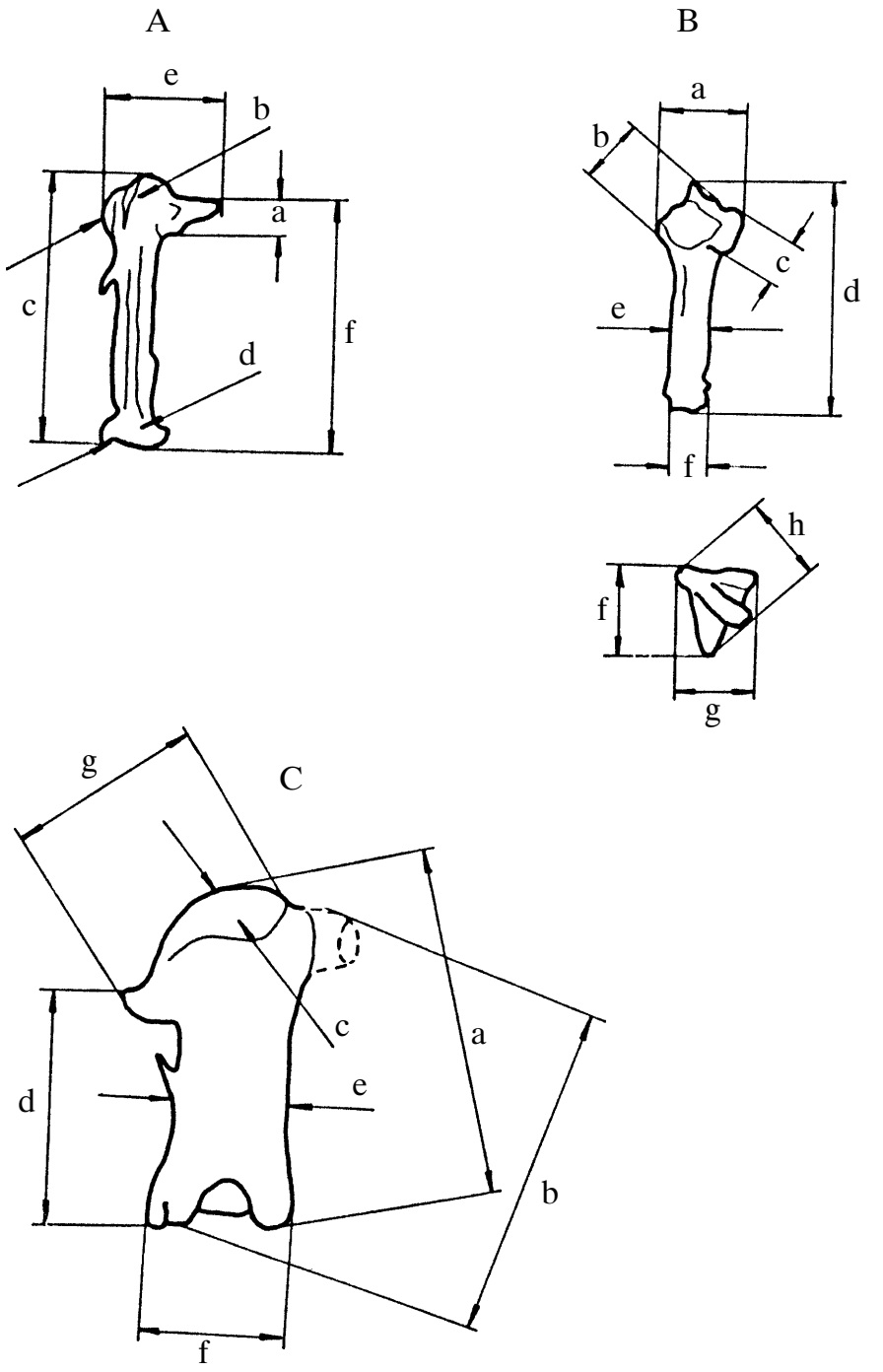

Fig. 3. The manner of measurings of carpometacarpus (A), ulna (B) and humerus (C) in *Apus* (drawings: Vera Hristova).

Geographical Distribution

As shown on Fig. 1, it now appears that *Apus baranensis* occured in Central and Southeastern Europe. We may expect further finds of this species in other southern regions of the continent - particularly Yugoslavia, Croatia, Italy, France, Roumania and Greece. The two known sites (Beremend 5 in Hungary and Varshets in Bulgaria) lie within 480 km of each other.

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Наличието на *Apus baranensis* Janossy, 1977, (Aves: Apodidae) в късния плиоцен на България

Златозар Боев

(Резюме)

Бараненският бързолет бе известен досега само по една лакътна и част от раменна кост от късния плиоцен (зона MN 16) от находището Beremend 5 в Южна Унгария, откъдето е описан от Janossy (1977). Статията представя 9 нови находки (5 carpometacarpi, 2 humeri и 2 ulnae) от най-малко 5 възрастни индивида, събрани от средно-вилафранкското находище на фосилна фауна и флора край гр. Вършец, датирано като зона MN 17. Carpometacarpus-ът представлява нов неизвестен досега скелетен елемент на *A. baranensis.* Неговият processus extensorius, както и tuberculum dorsale на crista pectoralis на раменната кост са относително много по-дълги в сравнение с тези на родствените му *A. apus* и *A. melba.*

Представена е подробна морфометрична характеристика на humerus-a, ulna-та и carpometacarpus-a. Средните стойности на общите дължини (mm) на тези кости са: humerus - 9,4 (n=3), ulna - 12,9 (n=3) и carpometacarpus - 15,3 (n=4).

Находището от България се намира на около 480 km от типовото находище на вида (Beremend 5) и бележи югоизточното разпространение на този вид в Европа.