



Fossil record of the Irish Elk (*Megaloceros giganteus* (Blumenbach, 1799)) (*Artiodactyla: Cervidae*) in Bulgaria

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Abstract. The study summarizes all scattered data on the former distribution of the Irish elk in Bulgaria, some of them unpublished till now. The seven known sites are located mainly in the northwestern part of the country at 40 to 400 m a. s. in the Lower Danube Plain. The chronostratigraphical distribution covers Middle Pleistocene (Upper Biharian) to Late Pleistocene (Epigravettian).

Key words: Extinct large mammals, Bulgarian Pleistocene megafauna, Cervids, Pleistocene.

Introduction

Although considered one of the symbolic species of the European Pleistocene terrestrial megafauna, the remains of the Irish Elk (*Megaloceros giganteus* (Blumenbach, 1799)) everywhere were not numerous, but its former distribution covered a vast parts of Eurasia. In the Pleistocene glacials the range of this impressive mammal (Fig. 1) reached Balkan Peninsula and the northern parts of present-day territory of Bulgaria. Its range was spread from the British Isles and Germany to Italy, Crimea, Caucasus, and Southern Siberia (GROMOV & BARANOV 1981). Chronostratigraphical distribution after GROMOV & BARANOVA (1981) was confined to Middle – Late Pleistocene, but recent studies found that species survived in the Latest Pleistocene and Holocene, even 7 700 BP (STUART *et al.* 2004) in Western Siberia.

Unfortunately, the first mentions of the Irish Elk in Bulgaria are unprecise. They only stated that the species' remains were found in some sites of the country, mostly in caves (N. 1931). The same way even more than a half of century later, APOSTOLOV (1985) noted about

remains of the giant deer in “Burgas Region” without concrete locality.

Present study aims to gather all scattered data on the distribution of the Irish elk (some of which published in less accessible and poorly known sources in the past), and to summarize all the available information on its distribution throughout the country. Such a study is important as the territory of Bulgaria lies on the southernmost limit of the species' range.

Material and Methods

We tried to gather all scattered data (published and unpublished) on the Irish Elk remains (bones, teeth) on the present day territory of Bulgaria. For each site (locality) we present as much as possible complete data on the age, type and number of finds, years and leaders of the excavations and the reference of the original published information.

Middle Pleistocene record

1. Varbeshnitsa

Prof. Nikolay Spassov (NMNHS-BAS) in 1993 collected some teeth of a large cervid, identified as *Megaloceros* sp. (N. SPASSOV, unpubl. data). POPOV

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(1988) dated this locality, based on micromammalian fauna as Middle Pleistocene - upper part of Nagyhasanyhegy phase of Upper Biharian.

Late Pleistocene record

2. Kozarnika Cave

GUADELLI *et al.* (1999, 2005), FERNANDEZ (2009) and SIRAKOV *et al.* (2010) reported on 6 species' finds, collected in the cave. They were dated 26 000 BP. (Table 1).

3. Mishin Kamik Cave

This is the newest site of *Megaloceros*, uncovered in 2015. The unspecified finds are listed as *Megaloceros* sp. (GUROVA *et al.*, 2016). The site is located in the region of some of the previous sites of the Irish Elk and once again confirms its distribution in the north-western part of the country. One of the species' bone remains (an astragalus) was split longitudinally by man (GUROVA *et al.*, 2017).

4. Muselievo

The only find was excavated in 1977 in a landslide on the right bank of the Osam River in the Vamata locality (SPASSOV, 1982) near Muselievo village (Pleven Region) (Fig. 1).



Fig. 1. *Megaloceros giganteus* – a reconstruction. Drawing: Zlatozar Z. Boev.

5. Magura Cave

IVANOVA *et al.* (2016) published data on 2 bone fragments (metapodial and maxillar) from layers 25 and 4 respectively, i. e. Over 50 200 BP and $32,750 \pm 500$ BP.

6. Temnata Douпка Cave

POPOV (1931) found “several fragments of antlers, maxillar and mandibular fragments,

several single teeth and a metacarpus” (p. 108). The author concluded that all they could not belong to *Cervus elaphus* Linnaeus, 1758 and *Rangifer tarandus* (Linnaeus, 1758) and suggests *Cervus euryceros* (i. e. *Megaloceros euryceros* Aldrovandi-Brookes, 1827) because of their larger dimensions.

LAVILLE *et al.* (1994) and BERON *et al.* (2006) listed Irish Elk among the fossils from the cave without reference and more concrete data. GUADELLI & DELPECH (2000) identified 3 finds (metatarsus, metacarpus and os capitotrapezoides) as “*Megaloceros* sp./*Alces*”.

7. Bacho Kiro Cave

BERON *et al.* (2006) listed Irish Elk among the fossils from the cave without any reference or more concrete data. Indeed, GARROD *et al.* (1939) reported the finding of *Cervus euryceros*, that is, *M. giganteus*, from the archaeological excavations in 1938 at the Bacho Kiro cave by a team of an American expedition. The remains are several teeth and a fragment of the right mandible.

KOWALSKI *et al.* (1982) report on 12 finds of the Irish Elk of 4 layers from the Late Pleistocene deposits of the cave, among them a maxilla with complete left tooth-row (PS-M3) and incomplete right row (P3-M3).



Fig. 2. *Megaloceros giganteus* – partial skull with antlers. Late Pleistocene, Muselievo. Exhibition of the National Museum of Natural History, BAS, 27.07.2019. Photo: Z. Boev.

Discussion and Conclusions

The finds of the Irish Elk from Bulgaria proved the species occurrence in the Middle

and the late Pleistocene throughout the country. Our data confirmed its distribution only in the Lower Danube Plain and the Fore-Balkan in the Northern Bulgaria. No records are found south of the Balkan Range (Stara Planina Mountain) (Fig. 3). As seen, most of the species' localities are concentrated in the north-western quarter of the country.

The altitudinal distribution of the species in Bulgaria is 40 to 400 m a. s. l., i. e. lowland plains and lower hilly terrains. At the periphery of its range, in Bulgaria the Irish Elk roamed across the vast openland mostly plain landscape.

The chronostratigraphical distribution covers Middle Pleistocene (Upper Biharian) to Late Pleistocene (Epigravettian), i. e. 1.0 – 0.08 Ma.

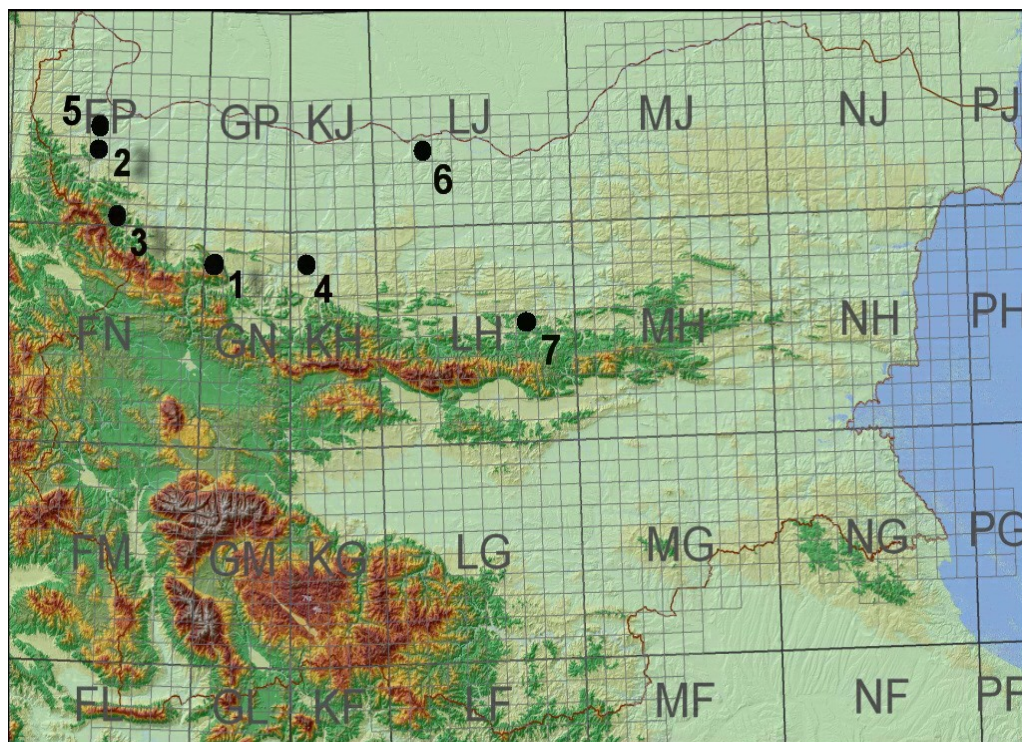


Fig. 3. Distribution of *Megaloceros giganteus* in Bulgaria after its fossil record: Middle Pleistocene: Varbesnitsa (1); Late Pleistocene: Kozarnika (Suhi Pech) Cave (2); Mishin Lamik Cave (3); Temnata Dupka Cave (4); Magura Cave (5); Muselievo (6); Bacho Kiro Cave (7).

Table 1. Localities, finds and age of the fossil record of the Irish Elk in Bulgaria.

No	Locality	Province	Altitude a. s. l. (m)	Age	Type and number of finds	Years and leaders of excavations	Reference
1.	Varbesnitsa	Near Varbeshnitsa v. (Vratsa P.)	370	Middle Pleistocene - Upper Biharian	several teeth	Nikolay Spassov, 1993	POPOV (1988); N. SPASSOV (unpubl. data)
2.	Kozarnika (Suhi Pech) Cave	Near town of Belogradchik (Vidin P.)	375	Late Pleistocene, MNQ 18-26 (end of Saalian, Eemian and Weischelian)	1 metatarsus dist., 5 unspecified finds	Nikolay Sirakov, J.-L. Guadelli, 1996-2005	GUADELLI <i>et al.</i> (1999, 2005); FERNANDEZ (2009); SIRAKOV <i>et al.</i> (2010)

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3.	Mishin Kamik Cave	Near Gorna Luka village (Montana P.)	400	135 000 – 85 000 Late Pleistocene	1 astragalus; unspecified finds	2015-2018	GUROVA <i>et al.</i> (2016,2017, 2018)
4.	Temnata Dupka Cave	Near Karlukovo v. (Lovech P.)	250	Late Pleistocene, Epigravettian, (31900-13600 B. P.)	several fragments of antlers, maxillar and mandibular fragments, several single teeth, 1 metacarpus	Rafail Popov, 1938; Nikolay Sirakov, 1982	POPOV (1931); POPOV (1994); LAVILLE (1994); BERON <i>et al.</i> (2006); IVANOVA <i>et al.</i> (2016)
5.	Magura Cave	Near Rabisha v., (Vidin P.)	371	Late Pleistocene, over 50 200 BP and 32,750 ± 500 BP	1 metapode fragment, 1 maxilla fragment	Stefka Ivanova, 2011-2012	IVANOVA <i>et al.</i> (2016)
6.	Muselievo	Near Muselievo v. (Pleven P.)	40	Late Pleistocene	1 cranial fragment with left antler	1977	SPASSOV (1982)
7.	Bacho Kiro Cave	Near town of Dryanovo (Gabrovo P.)	335	Late Pleistocene, Middle to Late Paleolithic, 70 000 – 20 000 B. P.	P ¹ , 2 M ¹ or M ² ; fragment of M ₁ or M ₂ ; P ¹ , M ¹ ; maxilla with a full left set of teeth (P ³ -M ³) and an incomplete right set (P ³ -M ³), fragment of right mandible with M ₁ -M ₂ , P ² , fragment of an upper molar; M ₁ or M ₂ , M ¹ or M ² .	1971-1975, B. Ginter, J. Kozłowski	KOWALSKI & NADACHOWSKI (1982); BERON <i>et al.</i> (2006)

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