



The Woolly Mammoth *Mammuthus primigenius* (Blumenbach, 1799) (Elephantidae Gray, 1821) in the Pleistocene in Bulgaria - A Review

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Abstract. The study presents for the first time summarized data on the presence of the Woolly Mammoth remains in Bulgaria from literature data, published in the last 144 years. The exact dates of the appearance and disappearance of the species in the country remain unknown. All the 31 published localities outlined the species presence between 90,000 and 26,000 BP. The majority (74 %) of the localities were situated between 20 and 250 m.a.s.l. in the Bulgarian lowlands and plains. The maximum altitude of the localities is 555 m a.s.l. The total number of the known finds exceeds 300.

Key words: Pleistocene megafauna, Proboscideans, Fauna impoverishment, Quaternary extinctions, Balkan environment.

Introduction

The Woolly Mammoth, *Mammuthus primigenius* (Blumenbach, 1799), is the most common species of the late Pleistocene megafauna of the mammoth steppe biome and the largest Quaternary land animal of Holarctic. Its lineage arose in northeast Siberia (Beringia) and its ancestor is the steppe mammoth - *Mammuthus trogontherii* (Pohlig, 1885) (Kurten, 2007; Lister & Sher, 2015). The Woolly Mammoth appearance in Europe after 200 ka is a result of a migration from the east (Stuart et al., 2002).

At the height of its distribution it was spread on three continents - Europe, Asia and North America. The Woolly Mammoth survived until 3,700 BP (Lister & Bahn, 2007; Vartanyan et al., 2008; Krzemińska et al., 2010).

In the Pleistocene the territory of Bulgaria was part of its range on the Balkans. After Álvarez-Lao et al. (2009)

and Ma et al. (2021) the southern species' range border in the SE Europe passed through Balkans (the southeast parts of Bulgaria) and the southern Pyrenees.

The most detailed information about the species in Bulgaria is presented by Markov (pers. comm.), who revised most of the preserved remains and summarized that *M. primigenius* in Bulgaria is known with "over ten finds" from 6 localities: Burgas, Zaraevo, Slivo Pole, Ryahovo, Cherepish and Parvomay. The author claims that "finds of *M. primigenius* in Bulgaria are usually single - without accompanying fauna, with unclear stratigraphy and, accordingly, of unknown age". ... (p. 163). "Separate teeth and a few mandibles, mainly from North Bulgaria, demonstrate the presence of the species in the country. Again, these are isolated finds without other fauna, and the ineres-

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ting problem of the last occurrence of this species in Bulgaria remains unresolved.” (Markov, pers. comm.: p. 145).

After Popov (1929a) in Bulgaria “mammoth remains were found in many places (Ruse, Popovo, Markovcha (pr. Markovo) village, Karlukovo village, Burgas, etc.)”. Bakalov (1932) reports on Woolly Mammoth’s remains found near Burgas, Aytos, Novi Pazar, Haskovo, etc. Nikolov (1963) summarizes that remains of Woolly Mammoth in Bulgaria have been uncovered in the regions of Sofia, Lom, Svishtov, Ruse, Yambol, Plovdiv and many other places. Fuchs (1879) and Petz (1879) after Nikolov (1977) described fossils of *M. primigenius* from the vicinities of Stara Zagora¹ and Yambol.

All these scattered data show that the distribution of the Woolly Mammoth in Bulgaria has not been the subject of a special study until now. The aim of the present study is to provide the records of the Woolly Mammoth remains in literature.

Material and Methods

In the present study is given a review of all available data on remains of the Woolly Mammoth in Bulgaria. For each site brief data on the location, approximate altitude, age (dating) and records, years and leaders of the excavations, as well as the source of the published data are presented (Table 1).

The chronostratigraphy follows Cohen *et al.* (2013; Mya): Gelasian 2.588-1.800 (covering parts of the former Late Pliocene - Early Pleistocene); Calabrian 1.800-0.774 (Early Pleistocene); Chibanian 0.770-0.129 (Middle Pleistocene); Upper Pleistocene 0.129-0.0117 (Late

Pleistocene); Greenlandian 0.0117-0.0082 (Early Holocene); Northgrippian 0.0082-0.0042 (Middle Holocene); and Meghalayan 0.0042-0.0001 (Late Holocene).

Results and Discussion

Markova *et al.* (2010) state that “In the Last Glacial Maximum (LGM), the mammoth was widely distributed throughout most of Europe except the Iberian Peninsula, the Apennine Peninsula, the Balkan Peninsula, and the Crimea Peninsula.” (p. 482). It is obvious that this author did not have the data from Bulgaria and the other Balkan (southern) countries. Gromov & Baranov (1981) clearly state that the mammoth range included Crimea and Tanscaucasia. Other authors (Álvarez-Lao *et al.*, 2009 and Ma *et al.* 2021) also support such a statement.

Collected data presented here mark that *M. primigenius* was present in the Bulgarian fauna in the Calabrian, Chibanian and the Upper Pleistocene, covering a period, approx. 90,000 - ?26,000 BP (Table1).

A part of the localities (Table 1), are listed without specifying their exact locations. This is because we follow available published data. Thus, it turns out that for Bulgaria there are reports in the literature about records of *M. primigenius* in at least 31 localities.

Obviously, the woolly mammoth disappears from the fauna of Bulgaria during the late Pleistocene. “The lack of dated remains leaves the question of the exact time of the species’ extinction unresolved.” (Markov, pers. comm.: p. 192).

As is shown in Fig. 1 all the 31 localities are located in the lowlands and plains - the Danube Plain, the Upper Thracian Plain, the Burgas Lowland and the Sofia Valley. Several localities in the northwestern Bulgaria are found in the mountain foothills - in the Pre-Balkan. It makes an impression that the species has not yet been established in the

¹ In his publication Nikolov (1977) mistakenly names “Nova Zagora” as “Stara Zagora”.

southwestern part of the country. This distribution is a result of the specific orography of Bulgaria - the southwestern half

is mostly mountainous and unfavorable for the woolly mammoths.

Table 1. Localities of fossil/subfossil bone remains of *Mammuthus primigenius* in Bulgaria.

No	Locality	Location/ Province	Altitude a.s.l. (m)	Age	Identification, type and number of finds	Years and leaders of excavations	References
1.	Samuilitsa Cave	Near Kunino v. (Vratsa P.)	ca. 360	Middle-Late Paleolithic (90 000 – 42 000 BP)	<i>Elephas primigenius</i> : “teeth”	1956-1959, N. Djambazov	Djambazov (1981)
2.	Temnata Dupka Cave	Near Karlukovo v. (Lovech P.)	250	Middle - Late Paleolithic (31,900- 13,600 BP)	<i>Elephas primigenius</i> : “many bones”; „bones and teeth”; “a few enamel plates from a molar; a tusk fragment and a small milk tooth”; „bones”	1938, R. Popov; 1982, N. Sirakov	Popov (1925, 1926, 1928, 1929b, 1931a, b, 1935, 1936, 1938); Mikov (1926) Beron <i>et al.</i> (2006)
3.	Ryahovo	Near Ryahovo v. (Ruse P.)	21	Middle- Late Pleistocene	<i>Mammuthus primigenius</i> : “left m3, right m3, right m3, left m3, right m3”	unknown	Markov (pers. comm.)
4.	Kozarnika Suhi Pech Cave	Near town of Belogradchik Vidin P.	481	Late Pleistocene (31,000 - 26,000 BP)	<i>Mammuthus primigenius</i> : 19 finds; “unidentified tooth”	1996-2005, N. Sirakov, J.-L. Guadelli	Guadelli <i>et al.</i> (2005); Fernandez (2009); Sirakov <i>et al.</i> (2010, 2012)
5.	Markovo	Boshkov Dol Locality, Near Markovo (Markovcha) v. (Shumen P.)	275	Late Pleistocene	<i>Elephas primigenius</i> : “a complete skeleton”	1908, unknown	Popov (1920; 1929b); Poppov (1913)
6.	Burgas	Burgas City (Burgas P.)	30	Late Pleistocene	<i>Elephas primigenius</i> : “single bones and teeth”; <i>Mammuthus primigenius</i> : “right semimandible with m3, together with a fragment of the left m3”	unknown	Anonym. (1901); Popov (1929a); Bakalov (1932); Bakalov & Nikolov (1964); Markov (pers. comm.)
7.	“Karlukovo caves” (Prohodna Cave, Svirchovitsa Cave)	Near Karlukovo v. (Vratsa P.)	250	Late Pleistocene	<i>Elephas primigenius</i> : “single bones and teeth”	unknown	Nikolov (1977, 1983); Popov (1929a)
8.	Pesht Cave	Near Staro Selo (Vratsa P.)	ca. 330	Late Pleistocene	Mammoth: “fragments of a tusk”	1951-1953, N. Dzhambazov	Dzhambazov (1952)
9.	Navasen	Near Navasen v. (Haskovo P.)	96	Pleistocene	<i>Elephas primigenius</i> : “one well- preserved fossilized molar; part of a tusk”	1932, D. Ivanov	Anonym. (1932)
10.	Ovcharitsa River bank	Near Trojanovo-2 Mine (Stara Zagora P.)	105	Pleistocene	Mammoth: “tusk”	1976, D. Komitov	Radichev (1976)
11.	Popovo	Near town of Popovo (Targovishte P.)	210	Pleistocene	<i>Elephas primigenius</i> : “single bones and teeth”	1923, Dobrev	Anonym. (1923); Popov (1929a)
12.	Golyamata Peshtera	Near Veliko Tarnovo (Veliko Tarnovo P.)	230	Pleistocene	<i>Elephas primigenius</i> : “small fragments of lobe bones; right lower jaw; several fragments of left mandible; canine tooth; fragment of a molar; more than 200 tusk fragments; main part of tusk; atlas; body of cervical vertebra; 6 processi transversi and processi spinosi; more than 50 fragments of ribs (Costae); broken humerus; three carpal bones (Ossa carpi); two bones from the fingers (Phalanges); several fragments of a third phalanx (Phalanx tertia)”.	1900-1909, R. Popov	Poppov (1913); Nikolov (1977, 1983); Beron <i>et al.</i> (2006)

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13.	Mladenova Propast	Near Chiren v. (Vratsa P.)	311	Pleistocene	<i>Elephas (Mammuthus) primigenius</i> ; no data	1964, Nikolov	I.	Nikolov (1977, 1983); Beron <i>et al.</i> (2006)
14.	Zaraevo	Near Zaraevo v. (Targovishte P.)	299	Pleistocene	<i>Mammuthus primigenius</i> : "left and right semimandible with m1 sin. et dext."	unknown		Markov (2004, pers. comm.)
15.	Slivo Pole	Near Slivo Pole v. (Ruse P.)	23	Pleistocene	<i>Mammuthus primigenius</i> : "right m3; left m3, right m3"	unknown		Markov (2004, pers. comm.)
16.	Cherepish	Near R/W station Cherepish, near Lyutibrod v. (Vratsa P.)	215	Pleistocene	<i>Mammuthus primigenius</i>	unknown		Nikolov (1969); Markov (2004, pers. comm.)
17.	Parvomay	Near town of Parvomay (Plovdiv P.)	134	Pleistocene	<i>Mammuthus primigenius</i> : "a fragment of m3d"	unknown		Bakalov & Nikolov (1964); Markov (2004, pers. comm.) V (1896)
18.	Pirgovo	Near Pirgovo v. (Ruse P.)	68	Pleistocene	<i>Elephas primigenius</i> : "remains"	1890		V (1896); Popov (1929a); Nikolov (1963)
19.	Ruse	Ruse City (Ruse P.)	45	Pleistocene	<i>Elephas primigenius</i> : "single bones and teeth"	1895		V (1896); Popov (1929a); Nikolov (1963)
20.	Chervena Voda	Near Chervena Voda v. (Ruse P.)	134	Pleistocene	<i>Elephas primigenius</i> : "mammoth teeth"	1892		V (1896)
21.	Harmanli	Near town of Harmanli (Haskovo P.)	60	Pleistocene	<i>Elephas primigenius</i> : "one well-preserved fossilized molar; part of a tusk; large leg bone"	1931-1932		Anonym. (1932)
22.	Nova Zagora	Near town of Nova Zagora (Sliven P.)	196	Pleistocene	<i>Elephas meridionalis</i> : no data; <i>Elephas (Mammuthus) primigenius</i> : no data	unknown		Fuchs (1879); Nikolov (1977)
23.	Yambol	Yambol City (Yambol P.)	114	Pleistocene	Mammoth: No data; <i>Elephas (Mammuthus) primigenius</i> : No data	unknown		Fuchs (1879); Nikolov (1963)
24.	Aytos	Near town of Aytos (Burgas P.)	95	Pleistocene	<i>Elephas primigenius</i> : no data	unknown		Bakalov (1932)
25.	Novi Pazar	Near town of Novi Pazar (Shumen P.)	156	Pleistocene	<i>Elephas primigenius</i> : no data	unknown		Bakalov (1932)
26.	Haskovo	Haskovo City (Haskovo P.)	203	Pleistocene	<i>Elephas primigenius</i> : "two tusks"	unknown		Bakalov (1932)
27.	Lom	Near town of Lom (Montana P.)	20	Pleistocene	Mammoth; no data	unknown		Nikolov (1963)
28.	Sofia	Sofia City (Sofia City P.)	555	Pleistocene	Mammoth; no data	unknown		Nikolov (1963)
29.	Svishtov	Near town of Svishtov (Veliko Tarnovo P.)	88	Pleistocene	Mammoth; no data	unknown		Nikolov (1963)
30.	Plovdiv	Near Plovdiv City (Plovdiv P.)	164	Pleistocene	Mammoth; no data	unknown		Nikolov (1963)
31.	Unknown locality	-	-	-	<i>Mammuthus primigenius</i> : right m3	unknown		Markov (pers. comm.)

Therefore, it is interesting to note here that the data from Bulgaria do not support the presented distribution map of the species by Álvarez-Lao *et al.* (2009), which shows that in the Balkans its range reached the Aegean Sea, but it is unknown why the Balkan Black Sea Coast remained outside it (Fig. 8, p. 67).

Conclusions

The presented data confirm that the territory of Bulgaria was part of the woolly mammoth's distribution range during

Pleistocene. The species was common in the largest plains and lowlands, at least in the late Pleistocene. The exact dates of the appearance and disappearance of the species in the country remain unknown. All the 31 published localities outlined the species presence at least between 90,000 and 26,000 BP. The majority (74 %) of the localities were situated between 20 and 250 m.a.s.l. The maximal localities altitude is 555 m a.s.l. The total number of the known records exceeds 300.

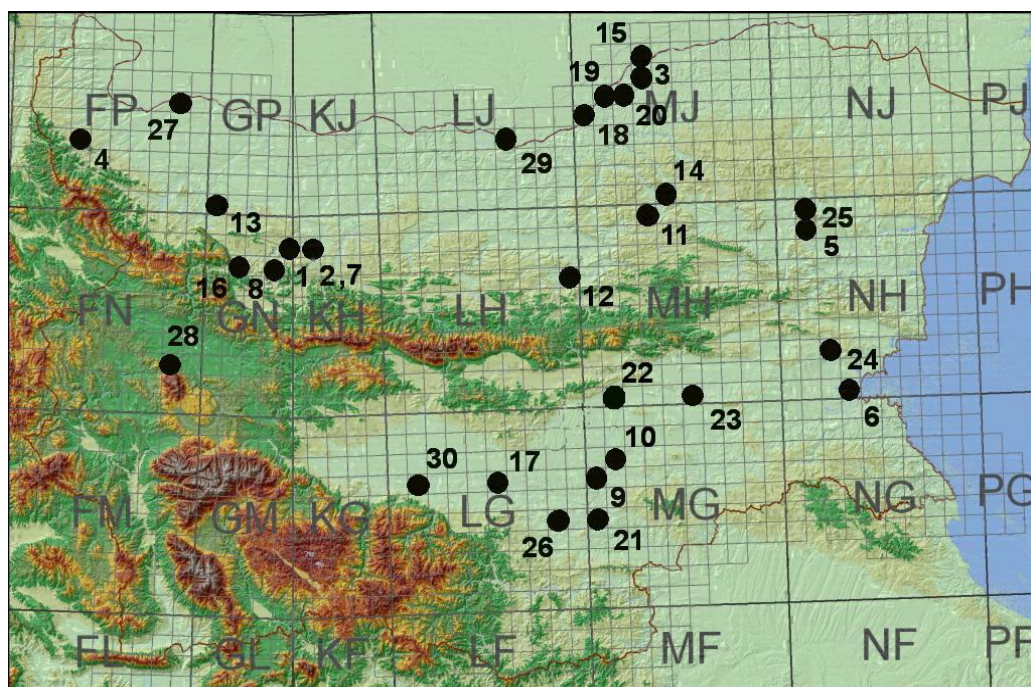


Fig. 1. Distribution of the Woolly Mammoth (*Mammuthus primigenius*) in the Pleistocene in Bulgaria (ref. to Table1): Samuilitsa Cave (1), Temnata Dupka Cave (2), Ryahovo (3), Kozarnika Sui Pech Cave (4), Markovo (5), Burgas (6), “Karlukovo caves” (Prohodna Cave, Svirchovitsa Cave) (7), Pesht Cave (8), Navasen (9), Ovcharitsa River bank (10), Popovo (11), Golyamata Peshtera (12), Mladenova Propast (13), Zaraevo (14), Slivo Pole (15), Cherepish (16), Parvomay (17), Pirgovo (18), Ruse (19), Chervena Voda (20), Harmanli (21), Nova Stara Zagora (22), Yambol (23), Aytos (24), Novi Pazar (25), Haskovo (26), Lom (27), Sofia (28), Svishtov (29), Plovdiv (30).

For a significant part of the localities reported in the literature (18 out of a total of 31), there is no data on their specific location, as well as on the nature of the finds. However, the data collected here allow for the first time to outline the former general distribution of the woolly mammoth in Bulgaria, a key territory of the Balkan Peninsula and the periphery of the species range.

The first information about the species in Bulgaria was published 144 years ago (Fusch, 1879). It is apparent that all finds except those confirmed by Markov (pers. comm.) need to be revised in light of modern understandings of the

composition of the genus *Mammuthus* Brookes, 1828 and the distribution of species within it. Unfortunately, the majority of these materials are now lost, their whereabouts are unknown, and they cannot be revised.

It is possible that some of the reports in the last century were misidentified and belonged to other species of the genus *Mammuthus* such as *M. rumanus* (Stefanescu, 1924), *M. meridionalis* (Nesti, 1825), *M. trogontherii* (Pohlig, 1881), reported for the country by Markov (pers. comm.), as well as of *M. intermedius* (Jourdan, 1861). However, any suggestion in this

direction would be speculative today. The information collected and presented here reflects the real state of the problem in Bulgaria at the present time.

Thus, at first glance, the present review is belittled. However, it is necessary to compile a comprehensive view of the state of study of the species, a research that has not been done so far.

As seen, the distribution of the mammoth has never been the subject of a specific research. Bearing in mind the wide distribution of the species and its large body size, which make it extremely advantageous in terms of taphonomy, there is no doubt that this scarce information will be supplemented to compile a more detailed picture of the appearance, distribution and disappearance of this species in the country.

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