The Leopard Panthera pardus (Linnaeus, 1758) in Bulgaria. A Review of the Paleontological Record and Archaeological Finds

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Abstract. The study is an attempt to collect and present all direct and indirect information about the former existence of the leopard in Bulgaria. Data on 2 Pleistocene sites (Bacho Kiro Cave and Triaglarnata Cave) of bone remains, as well as 14 archaeological monuments - 6 prehistoric (Neolithic and Chalcolithic) and 8 historical (antique and medieval) - representing objects of prehistoric and ancient art (statuettes, images) that contain or represent (presumed) images of leopards, are presented (according to literature data). The archaeologists' original interpretations of the primary sources are accompanied by the author's assessment of the reliability of their identification as leopards. It can be concluded that the leopard existed in Bulgaria until the end of the Pleistocene (until about 15,000 years ago). So far, there is no irrefutable evidence of its existence during the Holocene (Neolithic and Chalcolithic), despite the assumptions made in the literature about this. Some of the examined prehistoric monuments (Eleishnitsa, Dolnoslav, Golyamo Delchevo) probably represent statuettes of leopards, but most of the later images from antiquity were most likely borrowed from the southern provinces of the Roman Empire and cannot serve as evidence for the distribution of the leopard in Bulgaria in historical times.

Key words: Large carnivores, Subfossil fauna, history of Balkan wildlife, European fauna, Zooarchaeology.

Introduction

The modern leopard Panthera pardus (Linnaeus, 1758) is the species with the the most extensive range among felids. Therefore, it is understandable that on the two continents it still inhabits, its range is fragmented and in the individual areas the species exists through different and well-differentiated (eight) subspecies (Kitchener et al., 2017). Despite its extensive range, the leopard is today a globally vulnerable species according to the categorization of the International Union for Conservation of Nature (Red List Status: VU - Vulnerable, A2cd (IUCN version 3.1) (Stein et al., 2015).

The Fore-Asian (Caucasian) subspecies of the leopard Panthera pardus tuliana Valenciennes 1856 is still found in Transcaucasia in Georgia, Armenia and Azerbaijan, as well as in Russia in the North Caucasus. These are the regions that are geographically closest to the Balkan Peninsula and the territory of Bulgaria.

According to Stein & Hayssen (2013) the species arose 0.47-0.85 Mya ago in Africa. Later (about 0.17-0.30 Mya) it migrated to Asia. The oldest (3.5 Mya) reliable leopard fossils came from the Laetoli site in Tanzania. The oldest fossils in Asia were found in Iran (Siwalik site) and dated 2.0 Mya. Werdelin et al. (2010) state that the oldest leopard remains in Africa are dated about 2 Mya, and those of Eurasia came from 1 Mya.
Material and Methods
For the first time, an attempt has been made to summarize and present completely the archaeological and paleozoological direct and indirect evidences for the former presence of the leopard in today's Bulgarian lands. Some ancient depictions and monuments are analyzed and the paleontological localities of the species are presented. For each of them, data on their locations and dating are presented.

Results and Discussion
Former distribution in Europe
In Europe the earliest known fossils are dated 0.6 Mya (the mid Middle Pleistocene) (Ghezzo & Rook, 2015). In the Pleistocene in the north the leopard reached as far as Derbyshire (United Kingdom). The Province of Berlin (Germany) marks other northern limit in Europe. The deposits of Pleistocene leopards are most numerous in the periphery of the Alps, both to the north and to the south of the mountain massif. It is the same with the deposits around the Pyrenees in Spain and France. The leopard also penetrated the Apennine Peninsula and its spread to the south is documented to the Province of Rome (Italy). Data of Fischer (2000) show that the leopards inhabited a total of 18 (out of a total of 44) countries in Europe: Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, France, Georgia, Germany, Great Britain (including Gibraltar), Greece, Hungary, Italy, Portugal, Serbia, Slovenia, Spain, and the Netherlands. At least six sites, the Naciekowa, Obok Wschodniej, Radochowska, and Wschodnia Caves from the Sudety Mountains and the Bišnik and Dziadowa Skala Caves from the Kraków-Częstochowa Upland, have documented the presence of the leopard in Poland between MIS 10/9 and MIS 3. (Marciszak et al., 2011, 2022; Krajcarz et al., 2014). As summarized by Marciszak et al. (2022) the Pleistocene history of P. pardinus in Europe has been documented from 312 localities.

Diedrich (2013) lists four Pleistocene leopard subspecies in Europe: Panthera pardus begoueni (Fraipont, 1923), Panthera pardus sickenbergi, Schütt, 1969, Panthera pardus antiqua (Cuvier, 1835), and Panthera pardus spelaea Bächler, 1936. The oldest lived 0.6 Mya, and the youngest (P. p. spelaea) appeared at the beginning of the Late Pleistocene. It survived until about 0.024 Mya in some parts of Europe (Diedrich, 2013).

After Diedrich (2013) in the mid Middle Pleistocene in Europe appeared P. p. sickenbergi around 0.6 Mya. Schütt (1969) and Khalaf-von Jaffa (2013) assume that P. p. sickenbergi in Europe was replaced by the modern form in the Middle Pleistocene. P. p. sickenbergi is considered “a member of a fully interglacial forest fauna” (Khalaf-von Jaffa, 2013: p. 6).

In addition a new subspecies Panthera pardus vraonensis Nagel, 1999) was described from Holocene deposits of Attica (Southern Greece), dated 9375±1105 BP (Bachmayer et al., 1988) and 0.025-0.007 Mya (Diedrich, 2013). The last author considered P. p. vraonensis a younger synonym of P. p. spelaea.

The youngest European leopard records came from Ukraine (1st c. AD) and Italy (Sommer & Benecke, 2006). These authors note that the question on the natural distribution of P. pardinus in the sub-Atlantic in Europe remains unresolved.

It is believed that the last European Ice Age leopards (P. p. spelaea) survived in Europe until 0.025-0.024 Mya (Diedrich, 2013; Pajjmans et al., 2018). The Iberian Peninsula was the last European refuge for the species (Marciszak et al., 2022). Pajjmans et al.
(2018) found a deep split between African and Eurasian lineages (~0.71 Mya), with European ancient samples being sister to all Asian lineages (~0.48 Mya).

At present in Europe the leopard (*P. p. tulliana*) survived only in the North Caucasus.

**Panthera pardus spelaea on the Balkans and Western Anatolia**

So far, 15 Quaternary localities of leopards are known from the Balkan Peninsula. Pleistocene bones of *P. p. spelaea* were excavated in 7 localities in Greece: (1) Loutra Arideas Bear Cave – Macedonia (Tsoukala et al., 2006; Symeonidis et al., 1980); (2) Vraona Cave – Attica (Fischer, 2000; Diedrich, 2013; Symeonidis et al., 1980; Nagel, 1999); (3) Petralona Cave – Chalkidiki (Baryshnikov & Tsoukala, 2010); (4) Dryos Cave - Eastern Macedonia and Thrace (Diedrich, 2013; Georgiadou-Dikaioulia et al., 2002); (5) Klisoura Cave - Western Peloponnese (Koumouzelis et al., 2001); (6) Apidima Cave - Mani Peninsula (Fischer, 2006; Diedrich, 2013) and (7) Kitseli karst - Alea, Nemea, Peloponnese (Diedrich, 2013). Bone remains and partial skeletons have been excavated also in Serbia in (8) Baranica II Cave – southeastern Serbia (Dimitrijevic, 2011); and Bosnia and Herzegovina in (9) Vjetrenica Cave - southern Bosnia and Herzegovina (Diedrich, 2013; Miculinic, 2012).

Holocene records of leopard remains are known also from: Greece - Vraona Cave – Attica (Symeonidis et al., 1980), Montenegro - Crvena Stijena (March et al., 2017), and Late Pleistocene (Paleolithic) from Romania - Northern Dobrudja (Ştefan & Dumitraşcu, 2022). After Spassov and Stoytchev (2005) “The supposition that it inhabited South-Eastern Europe until the Holocene is indirectly supported by the discovered Neolithic and Eneolithic figurines of leopards in Bulgaria and Romania.” (Spassov & Stoytchev, 2005: p. 13).

Recently in the neighboring Turkey after Başkaya et al. (2022) 84 new records (of *P. p. tulliana*) were obtained from 54 localities, most of them from the northeastern parts of the country, i.e. the spread of the species has been conclusively proven.

Late Pleistocene Anatolian records came from Karain Cave - SW Anatolia (Diedrich, 2013).

**Fossil record of Panthera pardus in Bulgaria**

The fossil record of *P. pardus* in Bulgaria came from two Late Pleistocene localities, one in northern, and the other in southern Bulgaria (Fig. 1).

**Fig. 1.** Location of the Pleistocene sites of *Panthera pardus* and the prehistoric and ancient monuments of leopard images in Bulgaria: Squares – fossil record: Bacho Kiro Cave (1), Triagalmata Cave (2); Circles – archaeological monuments: Eleshnitsa (3), Gnilyane (4), Dolnoslav (5), Golyamo Delchevo (6), Mezek (7), Siliстра (8, 9), Varna (10), Nesebar (11), Gradesnitsa (12).
Bacho Kiro Cave (near town of Dryanovo, Gabrovo Province). They are dated to the Late Pleistocene (47,000 - 29,000 BP) (Wiszniewska, 1982). In 2019 Nikolay Spassov (NMNHS - BAS) identified new finds (limb bones) of *P. pardinus* in this cave.

In 1997 in the Triaglalmata Cave in the Western Rhodopes Mts. (near the village of Borino, Smolyan Province) were found mandibles of two leopards (male and female). They have been dated to the Late Glacial age (15,570±310 BP), ones of the youngest finds of *P. p. spelaea* in Europe (Spassov & Raychev, 1997). Based on detailed comparisons of teeth as well as other features, the authors found that "Rhodopean" leopard completely fitted the characteristics of previously known Mediterranean leopards. These authors believe that at least the eastern Mediterranean leopards were identical to those of the Middle East and probably belonged to the same subspecies.

Panthera pardus in the monuments of prehistoric and ancient art in Bulgaria

Panthera pardus in the prehistoric (Neolithic and Chalcolithic) monuments

At the beginning of the 1980s, a ceramic figurine depicting a leopard was excavated in the area of "Delnitsi" near the village of Eleshnitsa (vicinity of town of Razlog, Blagoevgrad Province) in the valley of the Mesta River (Fig. 2). It is dated 6000 BC (Early Neolithic) (Nikolov & Maslarov, 1987). The figure is so realistic that it is believed that the ancient sculptor was well acquainted with the depicted large predator. According to the authors, only the front part of the sculpture (head and neck) was found. "The ancient sculptor skillfully depicted the characteristic features of the head of this predator. To a high degree, this is due to the successfully modeled nose and the eyes elongated into slits. The mouth is represented slightly open. The ears are elongated to the sides and upwards. The animal's expression shows attention, tension. The head was covered with a red engobe of which only traces have survived. The same goes for decorating with white paint. Remains of it can be seen in the mouth (probably the teeth of the predator were shown) and also around the eyes (probably the spotted fur of the leopard was depicted)" (Nikolov & Maslarov, 1987: p. 10-11). The authors state that no other Neolithic figurines of leopards are known in that part of the Balkans. After them in Asia Minor and Anatolia, the cult of the leopard is attested from the early Neolithic and continued until the Iron Age (6th – 2nd millennium BC).

Commentary: The statuette fragment undoubtedly represents a carnivore mammal of the cat family. Characteristic features in habit such as coloration, limb proportions, length and shape of ears of (theoretically) possible species exclude caracal *Caracal caracal* (Schreber, 1776), serval *Leptailurus serval* (Schreber, 1776), lynx *Lynx lynx* (Linnaeus, 1758), tiger *Panthera tigris* (Linnaeus, 1758), cheetah *Acinonyx jubatus* (Schreber, 1775) and wildcat *Felis silvestris* Schreber, 1777. The statuette of the head has the greatest similarity with a lion (lioness) *Panthera leo* (Linnaeus, 1758) and a leopard. The patterns, which can be seen as marks on the head, have served archaeologists as proof that it is a leopard. We can only tentatively accept this. It seems less likely to depict a female lion (lioness) than a leopard.

Another miniature statuette of a (presumed) leopard (Fig. 3) was found in the Okol Glava Locality, near the former village of Gnilyane (now part of the
town of Novi Iskar, Sofia Province), dated 3000-1900 BC, i.e. from the late Neolithic (referred to s. c. Kurilo culture) (Spassov & Raychev, 1997).

After these authors “The eyes of the depicted beast of prey from Gnilyane are specially emphasized. They are big and bulging, typically feline. The proportions are those of a large felid - rather those of a leopard - without even a hint of a lion mane.” (p. 86). Commentary: The statuette fragment appears eroded and particular details on it are difficult to discern. A relatively small head set on a thick neck is noticeable. The maxillary part of the skull is relatively short. This at least distinguishes it from the canids and approaches to the felids. Determining the species affiliation of this find is quite speculative.

“Images of leopard were also found in Slatino (in the Struma Valley), and in the lowest layer of the settlement mound in Sedlare (in the Arda Valley) a female ceramic statuette "sits" on an inlay, which in Anatolia scholars always interpret like leopard skin. In all three cases the connection with Hajilar and Çatalhöyük, where the cult of this animal existed for quite long period (VII-II millennium BC), is beyond any doubt.” (Nikolova & Genov, 2013: p. 274).

In Bulgarian archaeozoology the locality near Slatino village is known with its bone remains of European lion Panthera leo persica (Meyer, 1826). The site is dated the end of the early Chalcolithic (middle of the 5th millennium BC (Ninov, 1989). Commentary: Despite the published information about images of leopards from the vicinity of the Slatino village, the images themselves have not been published and we cannot comment on
the reliability of their identification as leopards.

After Raduncheva (1994) for now, only one female statuette dressed in leopard skin is known from Bulgarian lands. It was discovered in the Chalcolithic production center near the mentioned above Sedlare village, Kardzhali region. Commentary: Despite the published information about images of leopards from the vicinity of the Sedlare village, the images themselves have not been published and we cannot comment on the reliability of their identification as leopards.

“In some of the temples of Dolnoslav, altars reminiscent of the outline of the "cat's" head were found. In one of the temples, a three-meter figure of a lying leopard was cleared. Despite the large schematization of the image, the small dimples covering the back of the animal allowed us to identify its species affiliation [as leopard - Z. B.].” (Raduncheva, 1994). “That is why the presence of leopard figurines and relief images of the same animal in a temple complex, such as the one near the village of Dolnoslav, is of great importance.” (Raduncheva, 1994). Radiocarbon dating 5530 and 5480 ± 60 BP confirm the reference to Late Chalcolithic (Boyadzhiev, 1992). Commentary: Unfortunately, we could not come across any published images of the analyzed finds. Undoubtedly, "a three-meter figure of a lying leopard" would be of great interest, but at this stage any comments would be unwarranted. Another publication by Raduncheva & Koleva (1987) presents a fragment of a miniature ceramic statuette representing the head of a large felid - lion or leopard (Fig. 4). Deliberately placed dots (round dark spots) are noted at least on the lower jaw. There is one in the area of the nose and another under the left eye. The sickle-shaped depiction of the left eye matches the leopard's short cross-eyed black belt. The slope of the snout and the straight section of the left mandible also correspond to those of the leopard. The resemblance to a leopard cannot be completely ruled out. It even seems plausible.

An impressive statuette of a big cat (Fig. 5) was found in the settlement mound next to the village of Golyamo Delchevo, Varna region. “The paws, the tail and especially the decoration of the statuette from Ploska Mogila speak for the belonging of the depicted specimen to the group we are interested in. The graphite decoration applied to the body gives reason to assume that this is an animal with banded skin decoration. Therefore, we believe that it may be an image of a tiger. The statuette from Golyamo Delchevo is a specimen with an unprecedentedly good and accurate rendering of the facial features and the silhouette of the entire figure (Raduncheva, 1994: p. 48). Commentary: The first cervical vertebra of a lion was also found in the Neolithic settlement near Golamo Delchevo. The leopard in this locality has not been identified by
bone remains (Ivanov & Vasilev, 1975). The proportions of the head, the position of the forelegs, the length and roundness of the posterior part of the body and the inception of the tail (which is not preserved) point to a large felid. The most likely possible species are leopard and lion. Definitely not an adult male lion with a mane. A leopard is more likely to be depicted.

“In the museum in the city of Vratsa, a large clay vessel is preserved, the upper part of which is decorated with highly schematic images of leopards, which are repeated rhythmically over the entire circumference of the vessel 13.” (Fig. 6). “They are used as a decorative motif.” (Raduncheva, 1994: p. 48). Commentary: In fact, it is a find from the 5th millennium BC from Gradeshnitsa (Pleven region) (Nikolov, 1974). The rounded head, the spotting of the whole body with circular black dot-like spots, the two front legs (also completely spotted) are clearly visible. The body is slender, but the front legs are not elongated as in the cheetah. It is not excluded that a decorative motif was depicted, in which images of a leopard were also included.

According to Spassov & Raychev (1997), the Neolithic images of leopards suggest that during the Neolithic it still inhabited Bulgarian territory.

**Fig. 5.** Statuette of a leopard from Golyamo Delchevo (Varna Region). Neolithic (after Raduncheva, 1994).

**Fig. 6.** Stylized image of a leopard. Gradeshnitsa. 5th millennium BC (after Raduncheva, 1994).

**Panthera pardus in the historic (Antiquity) monuments**

In the decorating of the red-figured bell-shaped crater (Fig. 7) from Milkova Mogila near Mezek village (Haskovo Province), dated end of 2nd quarter of 4th c. BC after Lazarov (1990) the “second satyr, bearded, naked, slung on left thigh leg leopard skin, in profile to right” (Lazarov, 1990: p. 110). Commentary: The curve of the posterior part of the tail, its rounded tip, as well as the evenly spaced round dotted black markings on the light background of the skin match those of the leopard.

Another bell-shaped krater (vessel) of 360-340 BC, found in 1958 in the necropolis of Messambria (now Nesebar), depicts Dionysus semi-recumbent on a bed covered with leopard skin. About another red-figured crater (Fig. 8), dated 4th c. BC Bakalova-Delijska (1960) mentions “a young maenad, … clothed
in leopard skin (p. 254), “the tossed leopard skin with heavily flared ends (p. 254), and “bed covered with leopard skin (p. 258).” Commentary: Regardless of the (bad) quality of the illustration (Fig. 8), two details are clearly visible - the light background of the skin with the dark point-like spots (some of which have a light central part), as well as the skin of the skinned two legs (forelegs) of the animal.

Fig. 7. Red-figured bell-shaped crater from Milkova Mogila near Mezek village. End of 2nd quarter of 4th c. BC. (Haskovo Province; After Lazarov, 1990).

However, this plot, as noted by Lazarov (1990), was very widespread in the Hellenistic world in antiquity. It is quite common on the ancient painted ceramics in Bulgaria. Commentary: The leopard skins were a widespread detail in the pictures representing the life of the ancient Hellenes. This means (regardless of the reliable identification of the skins as leopard skins) that in our case this ancient monument from Nessebar could not have any relation to the past distribution of the leopard in Bulgaria.

In one of the most significant monuments of Roman art in Bulgaria, the late antique Roman tomb in Silistra (dated the middle of the 4th c. AD; during the reign of Emperor Theodosius, 379-395 AD) on the vault we find realistic depictions of leopards (Fig. 9). According to Georgi Alexandrov (unpubl. data), this plot is often present in the iconography of Roman art as a certificate of noble origin, power and might. However, no one doubts the presence of leopards on Bulgarian lands, brought from the Roman provinces of Asia Minor and Syria. After (Atanasov, 2014) “… on the vault four times [the owner of tomb – Z.B.] is … shown … while hunting leopard, boar, bear, and birds.” (p. 17). Commentary: The round head, the rounded ears, the short muzzle, the position of the forelegs, the clear dotted dark markings on the body point to a leopard. On the other hand, the elongated nasal part is characteristic of canids rather than felids. There are other images in this ancient monument that most archaeologists identify as leopards.

An excellently preserved bronze statuette of a leopard (Fig. 10) is found in the same Roman tomb in Silistra. It has been identified by archaeologists as leopard. Commentary: The powerful body, the strong legs, the long curved tail ending without a tassel like a lion’s tail, as well as the markings on the body (although not dots, but elongated) point to the leopard.

“Completely in the spirit and aesthetics of "Developed Style" is one of the most impressive engravings among the early graffito ceramics from Bulgaria. The vessel [from Varna – Z.B.] is wide open and the entire inner plane is occupied by a figure of a running leopard.” (Fig. 11).
Fig. 8. Red-figured crater of necropolis of Nessebar. 4th c. BC (after Bakalova-Delijska, 1960).

Fig. 9. Image of ? a leopard from a sgraffito fresco on the ceiling of a Roman tomb in the city of Silistra. Middle of the 4th century AD (after Atanasov, 2014).

“The silhouette is engraved with a fine line, the spots are recreated by multi-

Fig. 10. Statuette from a chariot of a noble Roman from Durostorum representing a leopard. Late 3rd - early 4th century (after Atanasov, 2014).

ple concave points, the head is comparatively small, and the animal has a wide open mouth and a prominent tongue. The strong ones legs and strong neck emphasize the physical power of the predator. The body ends with a long tail, the tip of which is shaped like a palm tree. The image is made with exceptional skill, a sense of proportion and movement plasticity.” (Manolova-Voikova, 2003: p. 215). This monument is dated 2nd half of 11th to 12th c. AD. Commentary: The image is highly stylized. The contours of individual parts of the body are depicted by arcs. The mottling of the body is carefully represented by arranged black spots on a light (white) background. The head is also highly stylized, but the animal's right eye, two ears, upper and lower jaw, teeth and tongue are well distinguished. The two front legs are thin and strongly elongated. They look more like the legs of a cheetah. However, the vertical black patch over the eyes is very characteristic of the cheetah, which is clearly absent here. Of the hind legs of the image, only their upper (proximal, femoral) part is
preserved. The dating (11\textsuperscript{th} -12\textsuperscript{th} c.) in itself shows that it is not a depicted animal, delivered from nature. This monument also has nothing to do with clarifying the past distribution of the leopard in Bulgaria.

**Fig. 11.** Pottery ceramics from Varna. Middle of 12\textsuperscript{th} c. AD. (after Manolova-Voikova, 2003).

In the "Great Lavra" Monastery in the town of in Veliko Tarnovo a clay candlestick was found. It has “… a heraldic image on the bottom of a clay vessel - two leopards facing each other, and between them - a stylized double-headed eagle…” (Popov, 1983: p. 118). Commentary: The find is dated 12\textsuperscript{th} c. AD. The publication for this monument contains no illustration, but its dating clearly indicates that it could not serve the purposes of the present study.

**Conclusions**

From the presented data for 2 Pleistocene sites, 6 prehistoric (Neolithic and Chalcolithic) and 8 historical (antique and medieval) monuments, it can be concluded that the leopard existed in Bulgaria until the end of the Pleistocene (until about 15,000 years ago). So far, there is no irrefutable evidence of its existence during the Holocene (Neolithic and Chalcolithic), despite the assumptions made in the literature about this. Some of the examined prehistoric monuments (Eleshnitsa, Dolnoslav, Golyamo Delchevo) probably represent statuettes of leopards, but most of the later images from antiquity were most likely borrowed from the southern provinces of the Roman Empire and cannot serve as evidence for the distribution of the leopard in Bulgaria in the historical times. So far, no leopard bone remains have been found in Neolithic and Chalcolithic settlements in the country, but lion remains have been found in a number of sites. As noted above, other researchers state that the leopard could inhabited South Eastern Europe until the Holocene (Spassov & Raychev, 1997).

The analysis also showed something else: the archeozoological and art history literature in Bulgaria is to a certain extent "contaminated" by arbitrary interpretations of archaeologists or specialist in arts, which probably distorts our ideas about the past distribution of some animals. In such cases, the relevant finds (archeological monuments) must be re-examined by zoologists, taking into account characteristic morphological details in habitus of animals, as well as their fossil/subfossil record.

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