

Fossil and subfossil records and recent status of shrikes (Passeriformes: Laniidae) in Bulgaria

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Abstract: A total of 13 Quaternary localities of three recent species of shrikes with a total of 24 bone and bone fragments are reported. They encompass Early Pleistocene (Biharian) to Late Holocene (subrecent) and reveal the wide former distribution of *Lanius collurio* throughout the country. Eleven localities are situated in the Northern Bulgaria and two – in southern regions of the country. Most of the localities are located in plain and hilly landscapes and only two localities are mountainous. For each species are provided data on the chronostratigraphic distribution, altitudinal distribution and the anatomical belonging of finds. Localities of *L. collurio* are located between 50 and 130 m a.s.l.

Keywords: Balkan Peninsula, history of Bulgaria's nature, palaeoenvironment, passerines, Quaternary birds

Introduction

Although the oldest fossil record of shrikes (Laniidae Swainson, 1824) has originated from Europe (Late Miocene from Polgardi 2, Hungary, see Mlíkovský, 2002; Middle Miocene from Felsőtárkány-Felnémet, Hungary, see Kessler & Janos, 2012), at present it is believed that the family of shrikes originated in the Australasian region (Josef, 2008). The family's Pleistocene fossil records are abundant in Europe, but most of the localities are concentrated in the southern parts of the continent (Tyrberg, 1998). Shrikes have been well known in the Quaternary in the Balkan states. Bulgaria has one of the richest fossil record regarding shrikes both on the Balkan Peninsula and in Europe.

Towards 2015, a total of six species of shrikes have been established in the recent avifauna of Bulgaria: red-backed shrike (*Lanius collurio* Linnaeus, 1758), isabelline shrike (*Lanius isabellinus* Hemprich et Ehrenberg, 1833), lesser grey shrike (*Lanius minor*

Gmelin, 1788), great grey shrike (*Lanius excubitor* Linnaeus, 1758), woodchat shrike (*Lanius senator* Linnaeus, 1758) and masked shrike (*Lanius nubicus* Lichtenstein, 1823) (Ivanov et al., 2015). The paper aims to present for the first time data on the fossil records of shrikes in the country.

Results and discussion

Red-backed shrike *Lanius collurio* Linnaeus, 1758

At present, *L. collurio* is a migratory species from the southern regions of the boreal zone to the temperate zone in the Western Palearctic. The species inhabits open lands with dry soils and scattered thorny shrub and trees, steppes and semideserts (Harrison, 1982). The 16°C July isotherm limits its breeding range. The red-backed shrike is an indicator for sunny, warm and dry high-grassy habitats (Cramp & Perrins, 1993).

Table 1. Localities, finds and age of the fossil and subfossil record of shrikes in Bulgaria.

No.	Locality	Province	Altitude (m a.s.l.)	Age	Type and number of finds	Reference
<i>Lanius collurio</i> Linnaeus, 1758						
1	Cherdzhenitsa Cave – 1	Lovech	200	Early Pleistocene (Biharian) – 1,6 Ma	NMNHS 1133 humerus dex.; NMNHS 1134 humerus sin.	Boev (1999a)
2	Cave No 16	Lovech	200	Late Pleistocene (Riss-Wurmian – beginning of the Pleniglacial – 2) – 40 000–18 000 A.D.	NMNHS 814 humerus dex. prox.	Boev (1999a, b)
3	Kozarnika Cave	Vidin	480	Late Pleistocene (80 000 – 16 000 B.P.)	NMNHS 9662 ulna dex. dist.	Boev (2001)
4	Temnata Dupka Cave	Lovech	200	Late Pleistocene (Epigravettian – 31 900–13 600 B.P.)	NMNHS 4698 humerus dex. dist.	Boev (1994)
5	Kozarskata Cave	Sofia	550	Late Pleistocene (Pleniglacial – 2)	NMNHS 11434 tbt. sin. dist.	Boev (1999a)
6	Pisanets	Ruse	100	Late Pleistocene	NMNHS 16127 mand. dex. prox.; NMNHS 16128 cmc dex.; NMNHS 16129 phal. prox. dig. maj. sin.; NMNHS 16130 femur sin.	Mitev (2004, 2016a, b)
7	Madara – 1	Shumen	500	Early Holocene (?10 000–7000 B.P.)	NMNHS 15986 humerus sin.; NMNHS 15988 humerus sin. prox.; NMNHS 15987 ulna dex.	Boev (1999a)
8	Orehite	Dobrich		Middle Holocene	NMNHS 6520 humerus sin.	Boev (1999a)
9	Madara – 2	Shumen	500	Late Holocene	NMNHS 16341 mandibula dex. prox.; NMNHS 16039 mandibula dist.; NMNHS 16041 cmc dex.	Mitev (2004, 2006, 2016b)
10	Shirokovo	Ruse	150	Late Holocene	NMNHS 12768 tbt sin. prox.	Mitev (2004, 2016b)
11	Pop-Martinova Cave	Ruse	50	Late Holocene	NMNHS 14742 syns. corp. vert.	Mitev (2004, 2016b, c)
12	Tyovnata Dupka Cave	Smolyan	1300	Late Holocene	NMNHS 470 coracoid sin.	Boev (1999a)
13	Strelkovo	Silistra	100	Late Holocene	NMNHS 15776 tmt sin. dist.	Mitev (2004, 2016b)
<i>Lanius minor</i> Gmelin, 1788						
14	Shirokovo	Ruse	150	Late Holocene	NMNHS 12732 humerus dex. prox.	Mitev (2004, 2016b)
15	Pop-Martinova Cave	Ruse	50	Late Holocene	NMNHS 14726 tbt sin.	Mitev (2004, 2016b, c)
<i>Lanius excubitor</i> Linnaeus, 1758						
16	Shirokovo	Ruse	150	Late Holocene	NMNHS 12725 (aff. <i>L. excubitor</i>) tmt sin.	Mitev (2004, 2016b)

Status in Bulgaria: in the recent Bulgarian avifauna, the species is breeding and migratory. During migration, *L. collurio* is common throughout all the country (Ivanov, 2011), except the highest mountain regions.

Fossil records in the Western Palaearctic: fossil remains of *L. collurio* are known from Austria,

Croatia, Czech Republic, France, Germany, Hungary, Moldova, Romania, Ukraine and the United Kingdom (Tyrberg, 1998).

Chronostratigraphic distribution: Early Pleistocene (Romania) to recent (Mlíkovský, 2002).

Altitudinal distribution (fossil, subfossil) in Bulgaria: 50–1300 m a.s.l. (Table 1).

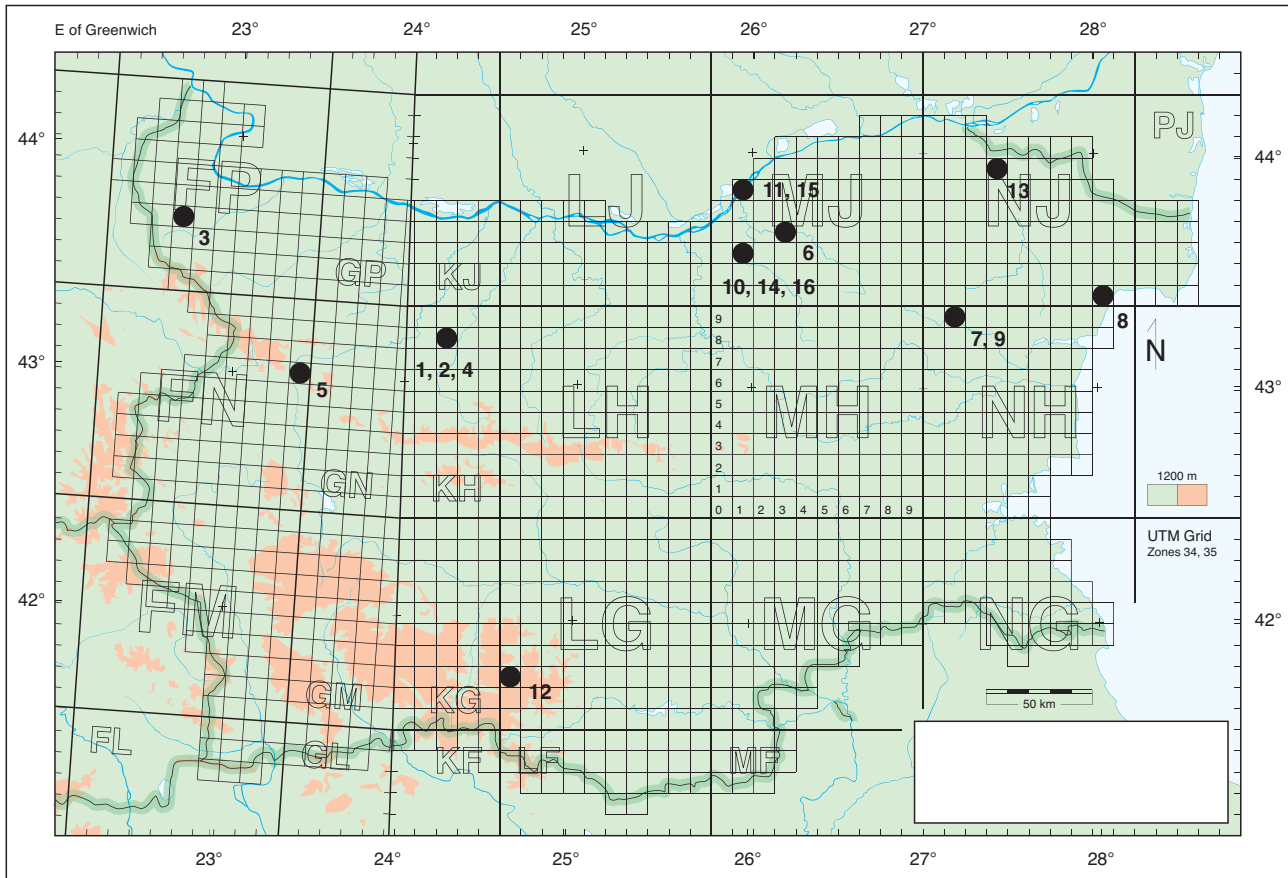


Fig. 1. Quaternary distribution of shrikes in Bulgaria (ref. to Table 1): Cherdzhenitsa Cave – 1 (1), Cave No 16 (2), Kozarnika Cave (3), Temnata Dupka Cave (4), Kozarskata Cave (5), Pisanets (6), Madara – 1 (7), Orehite (8), Madara – 2 (9), Shirokovo (10), Pop-Martinova Cave (11), Tyovnata Dupka Cave (12), Strelkovo (13), Shirokovo (14), Pop-Martinova Cave (15), Shirokovo (16).

Fossil record in Bulgaria: Early Pleistocene to Late Holocene — 13 localities (Fig. 1), seven provinces, 21 bone finds (Table 1).

Lesser grey shrike *Lanius minor* Gmelin, 1788

In the Western Palearctic, *L. minor* is a breeding bird in the drier temperate zone. It winters in subtropical to tropical zones in Africa, south of the Sahara Desert (Harrison, 1982). Inhabits “grassy areas with more tall trees, and in more forested areas than the great grey shrike” (Harrison, 1982: 214), forest edges, dry grass steppes and landscapes with scattered trees, parklands and orchards.

Status in Bulgaria: widespread throughout the country mainly in the plain and hilly areas up to 900 m a.s.l. (Ivanov, 2011).

Fossil records in the Western Palearctic: fossil remains of *L. minor* are known from Greece, France, Montenegro, Romania, Hungary and Spain (Tyrberg, 1998, 2008).

Chronostratigraphic distribution: Early Pleistocene (Romania and Greece) to recent (Mlíkovský, 2002).

Altitudinal distribution (fossil, subfossil) in Bulgaria: 50–150 m a.s.l. (Table 1).

Fossil records in Bulgaria: Late Holocene – three localities (Fig. 1), one province, two bone finds (Table 1).

Great grey shrike *Lanius excubitor* Linnaeus, 1758

At present, *L. excubitor* is a migrant and resident bird in the Western Palearctic. It breeds in drier subarctic to tropical zones and winters in temperate to tropical

zones. Inhabits partly open areas with scattered trees and tall shrubs from the scrub and forest tundra to the mixed and broadleaf forest, moorland and dry hillsides (Harrison, 1982).

Status in Bulgaria: regularly wintering but in small numbers and highly dispersed. Single specimens are found in winter in many regions of the country (Ivanov, 2011). *Lanius excubitor* is a critically endangered species according to the Bulgarian Red Data Book (Nikolov, 2015).

Fossil records in the Western Palaearctic: fossil remains of *L. excubitor* are known from Israel, Austria, Germany, Czech Republic, Croatia, France, Poland, Russia, Slovenia and Spain (Tyrberg, 1998, 2008).

Chronostratigraphic distribution: Early Pleistocene (Israel) to recent (Tyrberg, 1998).

Altitudinal distribution (fossil, subfossil) in Bulgaria: 50 m a.s.l. (Table 1).

Fossil record in Bulgaria: Late Holocene – one locality (Fig. 1), one province, one bone find (Table 1).

Conclusions

Skeletal representation indicated that in the collected bone material the most numerous were humeral bones (8), followed by tibiotarsi (3) and mandibles (3). A total of ten skeletal elements were represented in the Bulgarian fossil record.

Obviously, *L. minor* and *L. excubitor* were not abundant in the Pleistocene and the (Early) Holocene in Bulgarian localities of the Quaternary avifauna. We can explain that by the underrepresentation of the lesser to medium-sized passerines due to usual common taphonomic reasons. It is important to note that all of the studied localities were former feeding places of the Eurasian eagle-owl *Bubo bubo* (Linnaeus, 1758), which determines the frequency of shrike bone remains in the deposits. Eagle-owl hunts within a range of 50 km² from its nest during the breeding season and sometimes the prey may be captured 5–7 km away from the nesting site or feeding place.

All Quaternary localities (except for Shirokovo for *L. excubitor*) lie within the present species breeding range. The site of *L. excubitor* is among the southernmost localities of that species in the Palaearctic (along with the sites in Mallorca, Azerbaijan and Israel, see Tyrberg, 1998).

Although not very numerous, the fossil records of shrikes complete the scanty knowledge on the Pleisto-

cene and Holocene paleoenvironment in the region of its localities in Bulgaria. In the surroundings of each of them, the former distribution of the broadleaved scattered trees and tall shrubs and open-grass meadows is confirmed by the established skeletal remains of shrikes.

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