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FOSSIL RECORD AND DISTRIBUTION OF THE HAZEL GROUSE (*TETRASTES BONASIA*) (LINNAEUS, 1758) (PHASIANIDAE - AVES) IN BULGARIA

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Abstract

An analysis of the past geographical, altitudinal and chrono-stratigraphical distribution of the Hazel grouse (*Tetrastes bonasia*) remains in Bulgaria is given, based on fossil and subfossil bone remains. Data of 8 Quaternary localities (Calabrian to Meghalayan (former Early Pleistocene to Late Holocene)) from Bulgaria are presented. The records prove the wide distribution of the species mainly in the lowland plain landscapes in North Bulgaria in contrast to modern distribution. The localities were spread at 75 to 580 m a.s.l. but the majority of them were located bellow 250 m a.s.l. Most data originate from the prehistoric cave dwellings of the Paleolithic people.

Key words: Pleistocene avifauna, Tetraoninae, Quaternary gallinaceous birds, Balkan fossil/subfossil avifauna, Bulgarian Pleistocene environment

Introduction. The Hazel grouse (*Tetrastes bonasia* (Linnaeus, 1758)) is the smallest representative of grouse birds in Bulgaria and Europe. It is the species least dependent on coniferous forests. It inhabits mixed, coniferous and deciduous forests with undergrowth, clearings and meadows. In the mountains it reaches the upper tree line. The range of the species is limited by 13° and 21–22 °C July isotherms [1]. It is a native species of the boreal and temperate zones. The Late Holocene deforestation has reduced its range in recent millennia. The Hazel grouse is the most arboreal species among Tetraoninae grouses.

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Nowadays it lives in isolated places in the Rhodopes, Rila, Pirin, Stara Planina, Sredna Gora and Vitosha mountains. The national population is estimated to be around 1800–5000 pairs [2]. In Bulgaria, it has not been the subject of special research on its numbers and distribution. Since 1962, the species has been under the protection of the Nature Protection Act. It was included in the Bulgarian national Red Book in the "threatened species" category in 1985 [3], and in the "species with insufficient data" category in 2014 [4]. The Hazel grouse is a representative of the Siberian type of fauna in Bulgaria. Therefore it could be considered a Pleistocene relict in Bulgarian nature [5].

Material and methods. An attempt to gather all data on the former distribution of Hazel grouse on the present day territory of Bulgaria is made. Most fossil remains came from archaeological excavations of Paleolithic sites (Table 1). All fossil/subfossil bone material has been examined and identified by morphological comparisons with specimens of the avian osteological collection at NMNHS-BAS.

The chronostratigraphy of Quaternary follows [6] (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 Pleis-

Table 1

Localities of fossil/subfossil bone remains of *Tetrastes bonasia* in Bulgaria (ref. to Fig. 2)

No	Locality	Province	Altitude a.s.l. (m)	Age	Ref.
1	Kozarnika (Suhi Pech) Cave	Near town of Belogradchik (Vidin P.)	375	Calabrian – Early Pleistocene (1 000 000–700 000 BP)	[7]
2	Nanin Kamak Cave	Near Muselievo v. (Pleven P.)	ca. 75	Upper Pleistocene – Late Pleistocene (ca. 126 000–12 000 BP)	[8]
3	Devetashka Cave	Near Devetaki v. (Lovech P.)	400	Upper Pleistocene – Late Pleistocene (ca. 70 000 BP)	[9]
4	Cave No 16	Near Karlukovo v. (Lovech P.)	250	Upper Pleistocene – Late Pleistocene (50 000–20 000 BP)	[10]
5	Temnata Dupka Cave	Near Karlukovo v. (Lovech P.)	250	Upper Pleistocene – Late Pleistocene, Epigravettian, (31 900–13 600 BP)	[11]
6	Razhishkata (Suhata) Cave	Near Milanovo v. (Sofia P.)	580	Greenlandian – Final of the Late Pleistocene, probably including the transition to Holocene	[12]
7	Shirokovo	Near Shirokovo v. (Ruse P.)	130	Northgrippian – Early-Late Holocene	[13]
8	Nisovo	Near Nisovo v. (Ruse P.)	105	Meghalayan – Late Holocene	[13]

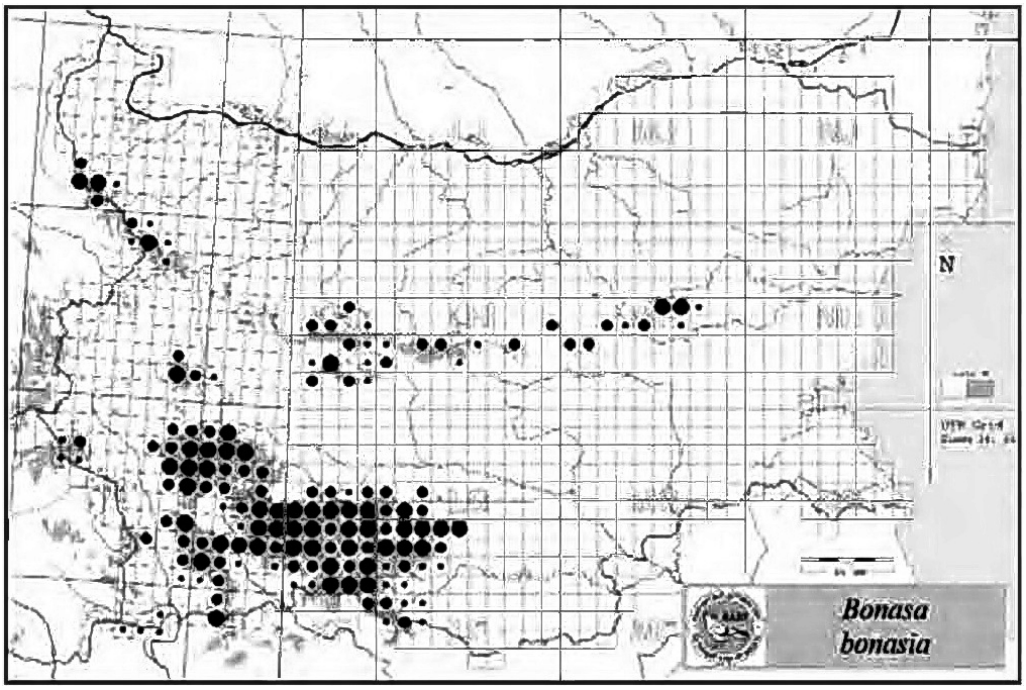


Fig. 1. Recent distribution of *Tetrastes bonasia* in Bulgaria (after [2])

tocene); 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. Gathered data cover eight Quaternary localities, six of them of Late Pleistocene, and two of Holocene age. As seen (Fig. 1, 2) all of them lie out of the present species range in the country. Localities Nos 1, 4 and 5 approach to the recent breeding grounds in the Western and Central Stara Planina Mnts. Notable are the remote localities in the Danube Plain (Nos 2, 7 and 8). The fact that all eight localities are located in Northern Bulgaria indicates that, at least during the Late Pleistocene, paleoecological conditions in Southern Bulgaria were probably somewhat less favourable for the species. Today, boreo-montane habitats have been best preserved in the mountain massifs in Southwestern Bulgaria.

The study provides first data on past distribution (Early Pleistocene to Early Holocene) of the Hazel grouse on the territory of Bulgaria. As can be seen in Fig. 1 its modern range in the country is located mainly in the southwestern part. Today it is split into eight parts. All these parts are mountainous – Western Stara Planina, Central Stara Planina, Rila-Rhodope massif (Rila, Pirin, Western Rhodopes), Vitosha, Osogovo, Vlahina, Slavyanka, and Belasitsa [2]. The modern distribution of the species today covers the mountains, while the data collected on its past distribution come almost entirely from the lowland plain landscapes

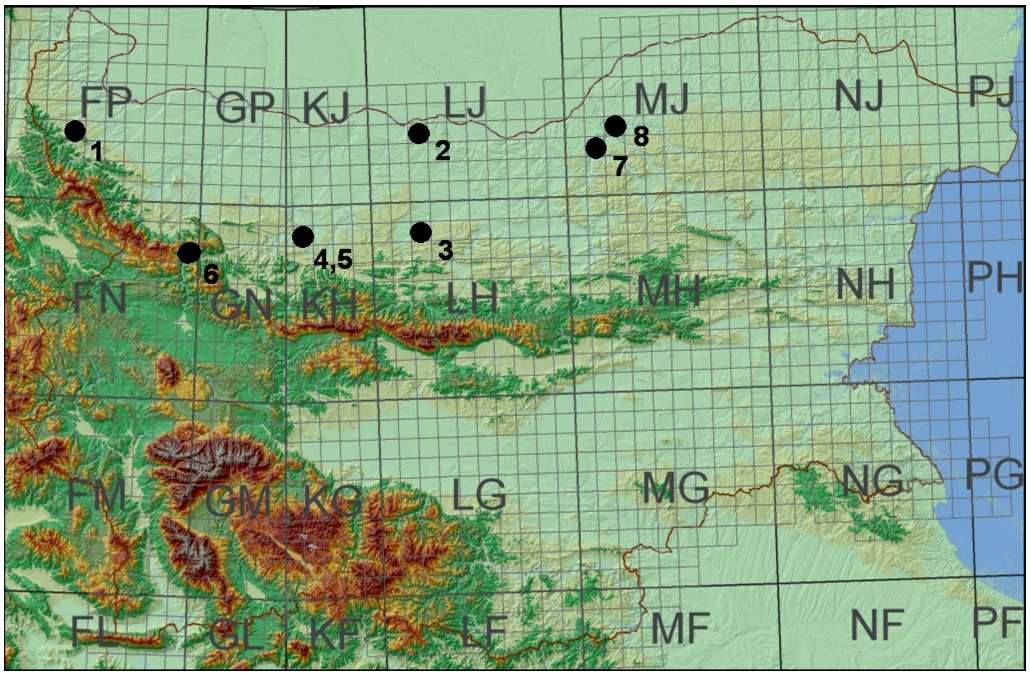


Fig. 2. Quaternary distribution of *Tetrastes bonasia* in Bulgaria (present study)

of the country. In this regard, the altitudinal distribution (according to the sites) is also of interest – from 75 to 580 m a.s.l. The majority of localities lie below 250 m a.s.l. Today, the main wood massifs at this altitude are oaks, ash, lindens, poplars, alders, etc.

Conclusions. The modern distribution of the species differs greatly from its distribution during the Pleistocene and (Early) Holocene. In the past, the plain landscapes of Northern Bulgaria (the Danube Plain and the Pre-Balkan) were inhabited, and today the range of the species is mainly limited to Southern (Southwestern) Bulgaria in the Rila-Rhodope massif and Stara Planina Range. These differences may be due to more favourable former conditions in the mixed broadleaf forests of the plains in the northern part of the country during the Late Pleistocene and Early Holocene.

Present-day species' distribution of a cold-loving bird in the mountains is due to the gradual climate warming in the Holocene. Present-day mountain environment approaches to former habitats in the lowlands in the Pleistocene.

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