Research article

First fossil jewel beetle (Insecta: Coleoptera: Buprestidae) from Middle Miocene deposits in Bulgaria

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Abstract: The first fossil jewel beetle discovered in Bulgaria is reported from deposits of the Satovcha Basin dated to the Middle Miocene.

Keywords: Balkans, Buprestidae, Miocene, Rhodopes, Satovcha

Introduction

The present contribution is a continuation of the study of the fossil insects from deposits of the Satovcha Basin dated to the Middle Miocene. Up to now, the fossil dragonflies and March flies were investigated from the region (Nel et al., 2016; Simov et al., 2021).

Here we present the first data of Miocene fossil coleopterans from Bulgaria, which represent also the first record of the fossil representative of the family Buprestidae from the country.

Material and methods

The studied fossil specimens were collected during the palaeobotanical expeditions in the region of Satovcha in the period 1958–1967, and in the beginning of the 1980s (Nel et al., 2016, Simov et al., 2021).

The Satovcha Basin (Satovcha Graben), which is located on the southern slopes of the western Rhodopes (SW Bulgaria), unfolds to the east from the Satovcha

Village, Blagoevgrad District. The site corresponds to a large, deep, eutrophic freshwater palaeolake (Vatsev & Pirumova, 1983; Vatsev, 1999). It is filled with Tertiary freshwater sedimentary and volcanic rocks. Two official lithostratigraphic units are recognised in the basin: the Satovcha Formation and the Sivik Formation (Vatsev & Pirumova, 1983). The Sivik Formation covers the Oligocene volcanics and the sediments of the Satovcha Formation. The sedimentary rocks of the Sivik Formation lie discordantly on them and consist of sandstones, aleurolites, sandy clays and diatomites with coal streaks (Vatsev & Pirumova, 1983; Vatsev, 1999; Ivanov, 2013). The fossil insects reported here were discovered in the Sivik Formation. They have been preserved as compression fossils in diatomite clays with only minor relief.

Based on the total content of the macroflora from all layers of the Sivik Formation, Bozukov (2002) has determined its age as Middle Miocene. That dating was also confirmed by the pollen analysis (Ivanov, 2004, 2012, 2013) and accepted in Nel et al. (2016) and Simov et al. (2021). Since the studied fossil insects ori-

Fig. 1. *Dicercini* gen. sp. indet. (Coleoptera: Buprestidae): Cat-III-2151, Division of Palaeobotany and Palynology, Institute of Biodiversity and Ecosystem Research, Bulgarian Academy of Sciences, Sofia, Bulgaria. Scale = 10 mm.

Fig. 2. Same, apical part of the abdomen with visible apical part of the aedeagus. Scale = 4 mm.

ginated from the lower part of Sivik Formation, their age should be considered as Middle Miocene.

Specimens were observed in dry state and photographed with camera Panasonic Lumix FZ82. All structures were measured (in mm) as preserved. The fossil specimens are deposited in the collections of the Division of Palaeobotany and Palynology, Institute of Biodiversity and Ecosystem Research, Bulgarian Academy of Sciences (IBER-BAS).

Results and discussion

Systematic palaeontology

Coleoptera Linnaeus, 1758

Buprestidae Leach, 1815

Dicercini Gistel, 1848

gen. sp. indet. (Figs 1–2)

Material: male, Cat-III-2151 (part), Division of Palaeobotany and Palynology, Institute of Biodiversity and Ecosystem Research, Bulgarian Academy of Sciences (IBER-BAS), Sofia, Bulgaria.

Description. Cat-III-2151 (part) (Fig. 1). Medium- to big- sized beetle, length 22 mm, width 10.5 mm, 2.1 times as long as wide. Dorsolaterally embedded, strongly compressed. Body brown to dark brown with darker parts of the pronotal disk and medial parts of the first 2/3 of ventral terga. Head not preserved. Pronotum transverse, moderately cordate. Pronotum length 8.6 mm and width 10.5 mm. Elytra obliquely truncate at humeri, sides then subparallel to mid length, arcuate to near apices and regularly arcuate just before apices. Elytra length ca. 15.5 mm, width 5.5 mm, length/width

= 2.82. Rather short and wide and finely punctato-striate. Hind legs with pale brown to brown femurs and darker tibia, robust; hind tibia 5 mm long. Last abdominal segment with broadly and gently arched apex. Partly extruded aedeagus is visible – widened in anterior half, narrowed in apical part (Fig. 2).

Remarks

The combination of the following features shows that the beetle undoubtedly belongs to family Buprestidae: body nearly cylindrical, slightly flattened, elongate-ovoid, cuneiform; pronotum irregularly quadrate, slightly narrowed in front and elytrae apically acuminate (Bellamy & Volkovitsh, 2005). The big size (22 mm), glabrous body, cordate pronotum, small scutellum, and more or less arcuate and finely punctato-striate elytra suggest it could be placed in the tribe Dicerini. Last abdominal segment with broadly and gently arched apex suggests the specimen is not of Chrysochroini. In general habitus the fossil beetle resembles much more representatives of the genera *Lampetis* Dejean, 1833 or *Perotis* Dejean, 1833 or other Dicerini. The incomplete preservation of the specimen does not allow species description or affiliation to exact genus.

The composition of the rich flora (Bozukov, 1998a, 1998b, 1999a, 1999b, 2000) supported the humid, warm-temperate to subtropical climate of this time interval (with temperatures above 15–16°C, and precipitation above 1000 mm) with frostless winters, while the vegetation corresponds to the mixed mesophytic forest (Ivanov, 2012, 2013). In terms of floristic composition, the fossil flora of Satovcha is closest to “evergreen broadleaved forest” and “mixed semi-evergreen forest” of Southeast Asia (Bozukov, 2001, 2002; Ivanov, 2012, 2013). Such conditions correspond well with the climatic requirements of the extant representatives of the above-cited buprestid genera. *Lampetis* and *Perotis* and Dicerini at all were widely distributed in present times in the tropic-subtropic regions of Asia, Africa and both Americas.

The discoveries of first fossil Buprestidae from the Middle Miocene in Bulgaria is of palaeobiogeographical importance. Currently, this is one of the oldest Miocene fossil records of Dicerini in Europe. A few described fossil species, *Perotis bruckmanni* Heer, 1862; *P. lavateri* Heer, 1847; *Capnodis antiqua* Heer, 1847; *C. puncticollis* Heer, 1847 and *C. spectabilis* Heer, 1862, originated from the locality of Öhningen

(South Germany) with the age assigned to the Late Miocene (Selmeier, 1990; Lutz, 1997; Fikáček & Schmied, 2013).

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