



First record of the subfamily Sagrinae (Coleoptera: Chrysomelidae) from the Eocene of North America

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Abstract. A new genus, *Palaeatalasis* gen. nov. (type species *P. monrosi* sp. nov.), from the tribe Megamerini (Chrysomelidae: Sagrinae) from the early-middle Eocene Green River Formation is described and illustrated. The new genus is similar to the Recent *Atalasis* Lacordaire, 1845 but differs from it in the subparallel sides of the pronotum, metafemora without teeth, and non-emarginate eyes. It differs from the Eocene *Eosagra* Haupt, 1950 in the large, convex, non-emarginate eyes, wide elytra, and transverse pronotum. The new genus is distinguished from the Paleocene *Gallopsis* Legalov, Kirejtshuk et Nel, 2019 in the wide forehead and convex eyes. It is the first record of the Sagrinae from North America and the fourth known species of the family Chrysomelidae from the Green River.

1 Introduction

Leaf beetles of the family Chrysomelidae, which are common inhabitants of Recent ecosystems, develop on leaves or in different plant organs. Twelve subfamilies, Sagrinae, Bruchinae, Donaciinae, Criocerinae, Cassidinae, Chrysomelinae, Galerucinae, Eumolpinae, Lamprosomatinae, Cryptocephalinae, Spilopyrinae, and Synetinae, can be distinguished within the family (Bouchard et al., 2011; Reid, 2014). The earliest record of the subfamily Chrysomelinae is in the Middle–Late Jurassic of Kazakhstan (Kirejtshuk et al., 2015), but these data require confirmation. The second fossil find of this subfamily was from the middle Eocene of Germany (Haupt, 1956). The first record of Bruchinae was from the mid-Cretaceous Burmese amber (Legalov et

al., 2020), Galerucinae from the Santonian Taimyr amber (Nadein and Perkovsky, 2018), Donaciinae from the Danian of Russia (Bieńkowski, 2015) and the late Palaeocene of Canada (Askevold, 1990), Sagrinae and Cryptocephalinae from the middle Paleocene of France (Piton, 1940; Legalov et al., 2019), Eumolpinae from the early Eocene Oise amber (Moseyko et al., 2010), Cassidinae from the early-middle Eocene of the USA (Chaboo and Engel, 2009), and Criocerinae from the late Eocene Baltic amber (Bukejs and Schmitt, 2016). The Lamprosomatinae were described from Baltic amber (Bukejs and Nadein, 2015; Bukejs, 2019). The Spiropyrinae and Synetinae are absent from the fossil history. The fauna of Chrysomelidae from the Green River Formation (late-middle Eocene, USA) is poorly studied. Only three species, *Eosacantha delocranioides* Chaboo et Engel, 2009, *Denaesapis chelonopsis* Chaboo et Engel, 2009 of the Cassidinae, and *Cryptocephalus vetustus* Scudder, 1878 of the Cryptocephalinae, were described. *Lema pervetusta* Cockerell, 1921, which was listed from the Green River deposits (Santiago-Blay, 1994), belongs to the family Cerambycidae (Bukejs and Schmitt, 2016). The species described in this study is the first find of the subfamily Sagrinae and the fourth species of the family Chrysomelidae from the Green River Formation.

2 Material and methods

The holotype is deposited in the Institute of Systematics and Ecology of Animals of the Siberian Branch of the Russian Academy of Science (Russia: Novosibirsk) – ISEA.

Descriptions, photographs, and body measuring were performed using a Zeiss Stemi 2000-C dissecting stereomicroscope.

Terminology of body structures is based on Lawrence et al. (2010).

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3 Systematic paleontology

Order Coleoptera Linnaeus, 1758

Suborder Polyphaga Emery, 1886

Superfamily Chrysomeloidea Latreille, 1802

Family Chrysomelidae Latreille, 1802

Subfamily Sagrinae Leach, 1815

Tribe Megamerini Chapuis, 1874

Genus *Palaeatalasis* gen. nov.

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Type species

Palaeatalasis monrosi sp. nov., herein designated.

Etymology

The name is formed from the Greek “palaaios” (ancient) and the generic name “Atalasis”. Gender masculine.

Diagnosis

Large distinctly sclerotized beetle; head prognathous, without middle sulcus, not constricted behind eyes; mandibles large; maxillary palpi long; eyes suboval, convex, non-emarginate; forehead wider than width of rostrum base; temples long; antennae filiform, reaching anterior third of elytra; pronotum transverse; sides subparallel; elytra suboval, striate; sutural stria deep, deeper than other striae; profemora and mesofemora moderately thickened; metafemora not toothed, distinctly larger than other femora; abdominal ventrite 1 long, 2.5 times as long as ventrite 2.

Comparison

The new fossil genus is similar to the Recent *Atalasis* Lacordaire, 1845 but differs from it in the subparallel sides of the pronotum, non-emarginate eyes, and metafemora lacking teeth, whereas *Atalasis* is characterized by the pronotal sides tapering from the apical part to the basal third, emarginate

eyes, and metafemora with teeth. It differs from the Eocene *Eosagra* Haupt, 1950 in the large, convex, non-emarginate eyes, wide elytra, and transverse pronotum. The new genus is distinguished from the Paleocene *Gallopsis* Legalov, Kirejtshuk et Nel, 2019 by the wide forehead and convex eyes.

Remarks

The head not narrowed basally, without rostrum, filiform antenna, and striate elytra suggest placement of *Palaeatalasis* gen. nov. in the family Chrysomelidae. The new genus belongs to the family Sagrinae based on the deep sutural stria, deeper than other striae, the metafemora distinctly larger than other femora, and the prognathous head without a median sulcus. The convex and non-emarginate eyes suggest placement in the tribe Megamerini.

Palaeatalasis monrosi sp. nov.

urn:lsid:zoobank.org:act:EFC39195-89EF-4C8E-B735-EE9777BF6A34

Figs. 1–2

Etymology

Patronymic. This new species is named in memory of Francisco Monrós, who studied Chrysomelidae.

Type material

Holotype. Holotype, ISEA, no. GR2020/2, counterpart of beetle.

Type stratum

Early-middle Eocene, Bridgerian, 53.5–48.5 Ma.

Type locality

United States: Utah, Uintah County, 3–4 km west of the railway crossing of the Green River, Green River Formation.

Description

Measurements. Body length (without rostrum) 17.7 mm, body maximum width 7.8 mm; pronotum length 3.5 mm, pronotum maximum width 3.6 mm; length of antenna 9.2 mm.

Body. Brown, distinctly sclerotized.

Head. Prognathous, without middle sulcus and without rostrum. Head capsule not constricted behind eyes. Labrum free. Mandibles large, curved. Maxillary palpi long. Eyes large, suboval, strongly convex, non-emarginate. Forehead wide, distinctly wider than width of rostrum base. Temples long, 0.6 times as long as eye length.

Antennae. Antennae inserted before eyes, filiform, long, reaching anterior third of elytra. Antennomere 1 oval,



Figure 1. Body of the counterpart of *Palaeatalasis monrosi* sp. nov., holotype, GR2020/2 (ISEA). Scale bars = 1.0 mm.

1.3 times as long as wide. Antennomeres 2–10 conical. Antennomere 2 1.3 times as long as wide, 0.5 times as long as and 0.4 times as narrow as antennomere 1. Antennomere 3 1.7 times as long as wide, 1.3 times as long as and equal in width to antennomere 2. Antennomere 4 2.0 times as long as wide, 1.3 times as long and 1.1 times as wide as antennomere 3. Antennomeres 5–9 subequal in width. Antennomere 5 2.4 times as long as wide, 1.4 times as long as antennomere 4. Antennomere 6 1.8 times as long as wide, 0.7 times as long as antennomere 4. Antennomeres 7–10 subequal in length. Antennomere 7 2.2 times as long as wide, 1.3 times as long as antennomere 6. Antennomere 10 2.8 times as long as wide, 1.1 times as long as and 0.9 times as narrow as antennomere 9. Antennomere 11 3.0 times as long as wide, 1.1 times as long as and equal in width to antennomere 10, weakly pointed at apex.

Pronotum. Weakly transverse, with subparallel sides, 0.9 times as long as wide in middle. Base 0.6 times as narrow as elytral base.

Elytra. Suboval, with weak humeri, weakly striate, 1.9 times as long as wide at base, 1.6 times as long as wide in middle, 2.3 times as long as wide at apical fourth, 3.6 times as long as pronotum. Interstriae quite wide. Punctate striae weak, with small rounded and dense punctures.

Thorax. Metacoxal cavities transverse.

Legs. Profemora and mesofemora moderately thickened. Metafemora enlarged without tooth, distinctly larger than other femora. Tibiae slightly curved, with carina. Mesotarsomere 1 conical. Mesotarsomere 3 bilobed.

Abdomen. Abdominal ventrite 1 long, 1.5 times as long as metacoxal cavity length. Ventrite 2 0.4 times as long as ventrite 1. Ventrite 3 0.8 times as long as ventrite 2. Ventrite 4

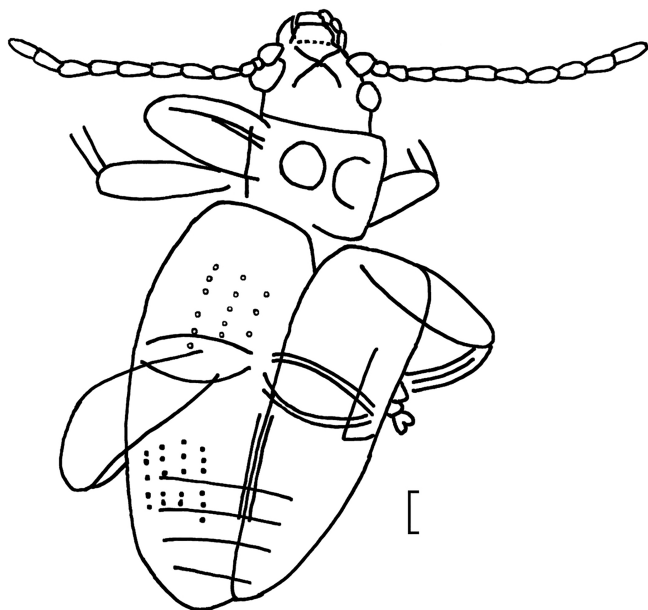


Figure 2. Body outline of the counterpart of *Palaeatalasis monrosi* sp. nov., holotype, GR2020/2 (ISEA). Scale bars = 1.0 mm.

1.23 times as long as ventrite 3. Ventrite 5 slightly longer than ventrite 4.

4 Discussion

Members of the Sagrinae were found in the middle Paleocene of France (Legalov et al., 2019) and the Eocene of Germany (Wappler, 2003; Wedmann, 2018). Formerly they were not known from the rich *Lagerstätten* of the United States, such as the Green River and Florissant, nor from Eocene Baltic amber (Kirejtshuk and Ponomarenko, 2018). This study is the first record of Sagrinae from North America. The Paleocene and Eocene Sagrinae belong to the tribe Megamerini, which is now distributed in Australia and southern South America and Madagascar (Monrós, 1960). This subfamily is now absent from the central and northern parts of South America, central and North America, the West Indies, the African deserts, and also the Palearctic. In the Western Hemisphere, the Sagrinae are distributed (Fig. 3) in tropical Africa, Madagascar, South and Southeast Asia, the Sunda Islands, and New Guinea, but the centre of their diversity is located in Australia. It can be assumed that Megamerini were previously distributed on all continents and were the most ancient and primitive Sagrinae. Primitive characteristics of the Megamerini are the striate elytra, convex, non-emarginate eyes, and head without rostrum.

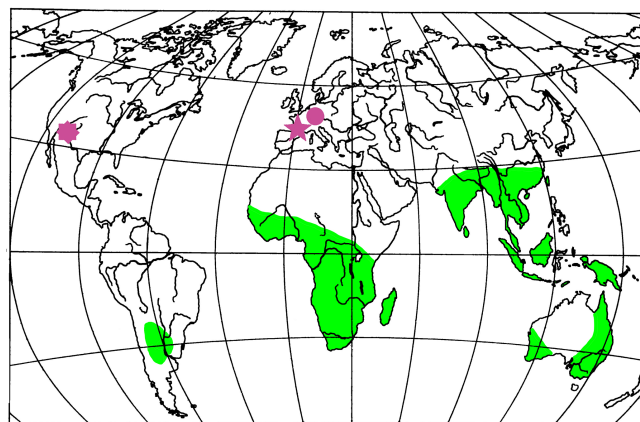


Figure 3. Distribution of Sagrinae: Recent members – green shaded area, octagram – fossil record from the Green River, star – record from Menat, circle – German Eocene record.

Sample availability. The specimen is deposited in the Institute of Systematics and Ecology of Animals, Siberian Branch, Russian Academy of Sciences.

Competing interests. The author declares that there is no conflict of interest.

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