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Spaniophagus, first new Eocene genus of silken fungus beetle from Baltic amber (Coleoptera: Clavicornia: Cryptophagidae)

Spaniophagus, первый род эоценовых скрытноедов из балтийского янтаря (Coleoptera: Clavicornia: Cryptophagidae)

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KEYWORDS. Baltic amber, Cryptophagidae, Late Eocene, Russia, *Spaniophagus*.
КЛЮЧЕВЫЕ СЛОВА. Cryptophagidae, *Spaniophagus*, поздний эоцен, балтийский янтарь, Россия.

ABSTRACT. A new genus, *Spaniophagus* **gen.n.** (type species *Spaniophagus hoffeinsae* **sp.n.**) is described from the Upper Eocene Baltic amber. The new genus belongs to tribe Cryptophagini. The new genus is similar to the extant genus *Spaniophaenus* Reitter, 1875, differing from the latter in absent emargination on anterior margin of pronotum and lack of angularity in lateral margin of pronotum. This is the first extinct genus from family Cryptophagidae, described from the Eocene.

РЕЗЮМЕ. Описан новый род *Spaniophagus* **gen.n.** (типовой вид *Spaniophagus hoffeinsae* **sp.n.**) из верхнеэоценового балтийского янтаря. Новый род относится к трибе Cryptophagini и схож с родом *Spaniophaenus* Reitter, 1875. Отличается от него отсутствием вырезки на переднем крае переднеспинки и формой бокового края переднеспинки. Это первый вымерший род семейства, описанный из эоцена.

Introduction

While studying of the fauna of the Eocene Baltic, Rovno and Bitterfeld amber, so far new species have only been found that belong to the genera represented in the modern fauna [Lyubarsky, Perkovsky, 2010, 2011, 2012, 2013, 2018, 2019; Perkovsky, Lyubarsky, 2014]. The Cretaceous fauna Cryptophagidae, on the contrary, is distinguished by a peculiar generic composition [Lyubarsky, Perkovsky, 2014, 2015, 2017a,b, 2018; Peris *et al*., 2017].

However, a specimen that was found in the Hoffeins collection, should be attributed to a new genus. By all the main characters, this beetle belongs to family Cryptophaginae, tribe Cryptophagini: width of labial palpomere 1 equal to palpomere 2; boss on front of head absent; gular sutures present; tibia slender, not club-shaped; metasubcoxal line absent; tarsi of male 5-5-4; ventrite 5 without tickened setae. For the tribe Cryptophagini the state of the characters is: pronotum with lateral margin modified, with callosity in anterior angle and middle tooth on the sides of pronotum; basal pits of pronotum present. However, for the genus *Spaniophaenus* Reitter, 1875 (Cryptophagini) the state of characters is: pronotum with lateral margin unmodified; basal pits absent. The new found specimen has the characters as in the genus *Spaniophaenus*: pronotum with lateral margin unmodified; basal pits absent. This is a typical representative of the tribe Cryptophagini.

In Late Eocene amber was found representatives of subfamily Cryptophaginae (*Antherophagus* Dejean, 1821*, Cryptophagus* Herbst, 1792*, Micrambe* Thomson, 1863*, Telmatophilus* Heer, 1841) and Atomariinae (*Atomaria* Stephens, 1829*, Ephistemus* Stephens, 1829). Recently was described a new Priabonian species: *Telmatophilus britannicus* Kirejtshuk et Kurochkin, 2019 [Kirejtshuk *et al*., 2019]. However, genus *Spaniophagus* differs from *Telmatophilus* by the tarsal formula of the male (5-5-5 in *Telmatophilus*).

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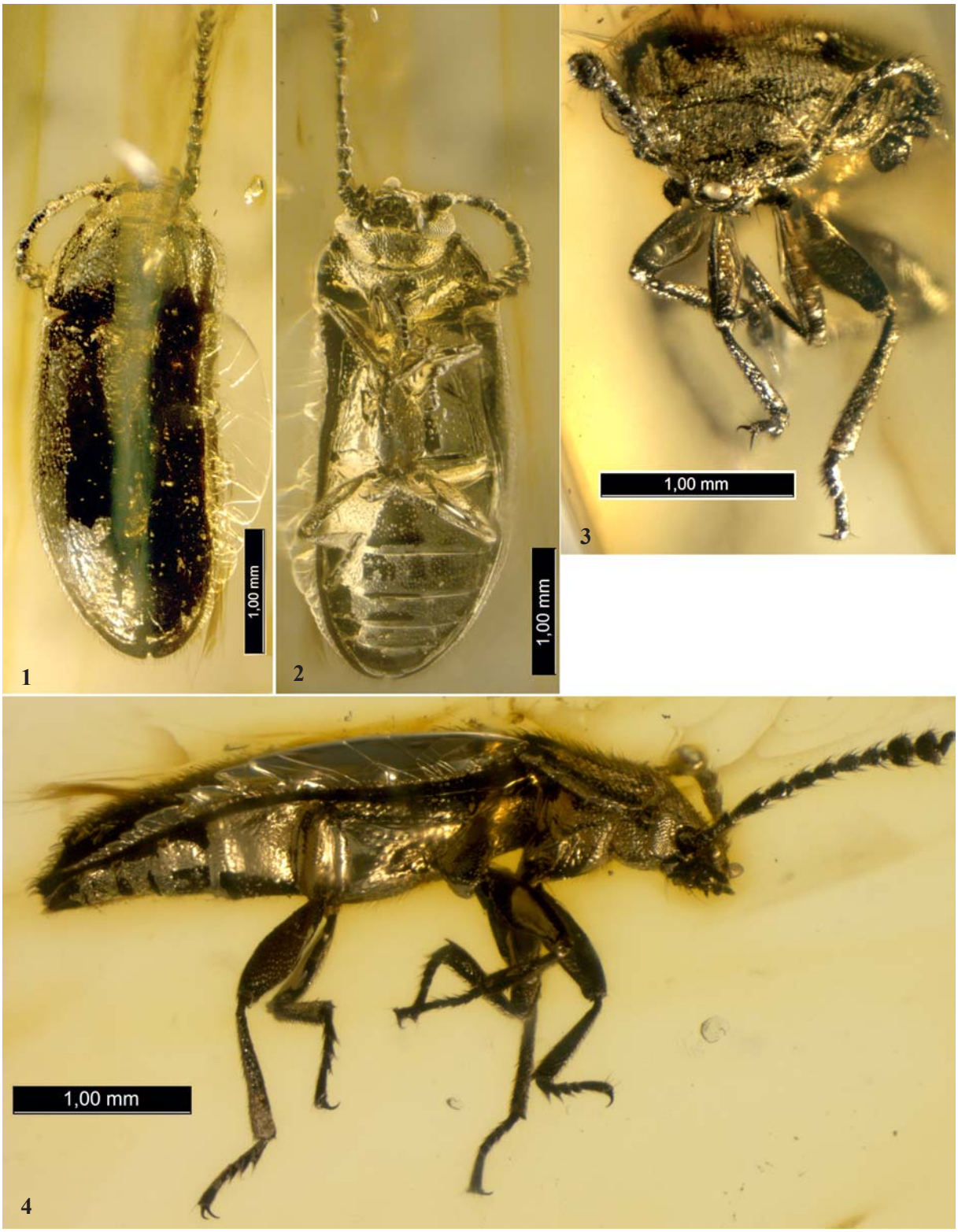

Figs 1–4. *Spaniophagus hoffeinsae* **gen.** et **sp.n.** Holotype (inv. No CCHH 824-4 from the collection of the Senckenberg Deutsches Entomologisches Institut, Müncheberg, Germany (SDEI)): 1 — dorsal; 2 — ventral; 3 — frontal; 4 — lateral.

Рис. 1–4. *Spaniophagus hoffeinsae* **gen.** et **sp.n.** Голотип (inv. No CCHH 824-4 в коллекции Senckenberg Deutsches Entomologisches Institut, Müncheberg, Germany (SDEI)): 1 — сверху; 2 — снизу; 3 — спереди; 4 — сбоку.

Taxonomy

Family CRYPTOPHAGIDAE *Kirby*, 1826
Subfamily CRYPTOPHAGINAE *Kirby*, 1826
Genus *Spaniophagus* Lyubarsky et Perkovsky, **gen.n.**
Figs 1–7.

Type species *Spaniophagus hoffeinsae* Lyubarsky et Perkovsky **sp.n.**

DIAGNOSIS. Body shape parallel-sided, moderately convex. Clypeus of male not notched. Antenna clubbed. Pronotum with anterior margin not emarginated; lateral margin not modified, not serrate, sinuate, or explanate; angularity absent; prominent middle tooth absent; sublateral line absent. Tibia slender, not club-shaped. Prosternal process not vaulted. Ventrite 1 longer than remaining ventrites. Tarsal formula 5-5-4 in male.

DESCRIPTION. Color of body dark brown. Body shape parallel-sided, moderately convex (Fig. 1). Punctation of body and elytron confused; punctation dense, distance between puncture on average less than diameter of puncture. Fronto-clypeal suture absent; subgenal spine well-developed; gular sutures present. Antenna clubbed; antennomeres not compact; last antennomere symmetrical and equal in length to penultimate (Fig. 2). Width of labial palpomere 1 equal to palpomere 2. Mentum with transverse ridge. Eye well developed, prominent. Boss on front of head absent (Fig. 3). Pronotum parallel-sided, its width does not decrease from the middle to the base; anterior margin of pronotum not emarginate; sides not explanate; margin unmodified (Fig. 5); angularity absent; prominent middle tooth absent; sublateral line absent; basal pits absent; median fold absent; basal groove absent.

Procoxae wide open posteriorly, separated by prosternal process. Prosternal process not vaulted; longer than anterior portion of prosternum. Mesosternum without parallel lines. Mesocoxae set very closely, width of mesosternal process equal to or 2/3 that of mesocoxa. Epimeron incomplete, extending to metasternum. Metasternal process subdepressed, not beyond mesocoxae. Distance between metacoxae approximately equal to diameter of metacoxa. Metasternum with median longitudinal line (Fig. 7). Metasubcoxal line absent.

Ventrite 1 longer than remaining ventrites, ventrite 5 without thickened setae. Tibia with apical fringle of spines. Tarsi slightly lobed below.

Male. Clypeus not notched. Antennal segments not compact. Ventrite 5 unmodified. Metatibia unmodified. Tarsal formula 554 (Fig 6); tarsomeres 1–3 of pro-, meso- and metatarsi dilated.

ETYMOLOGY. As the new genus is similar to the genera *Spaniophaenus* and *Cryptophagus*, the name is a combination of these generic names.

Spaniophagus hoffeinsae
Lyubarsky et Perkovsky, **sp. n.**

MATERIAL: Holotype, CCHH 824-4, Baltic amber, Yantarnyi, Late Eocene. Sex of the holotype: male. Holotype will be deposited in the amber collection of the Senckenberg Deutsches Entomologisches Institut, Müncheberg, Germany (SDEI).

DESCRIPTION. Length of body 4 mm, maximal width 1.5 mm. Body setae long, adpressed. Head densely punctuate, average width of puncture 0.002 mm, punctures separated by about ¾ diameter. Interantennal distance = 0.5 mm. Eye prominent, finely faceted, slightly asymmetrical, slightly smaller than the first segment of the antenna. Antenna elongate, extending beyond posterior margin of pronotum. 1st antennal segment slightly longer than 2nd; 3rd segment longest, 2 x as long as wide; segments 4–8 of approximately equal length, 1.5 x as long as wide; 9th and 10th trapezoidal, transversal; 11th oval, slightly asymmetrical.

Pronotum with longitudinal ridges on the sides; possibly the result of necrologic compression, since it is not completely symmetrical. Pronotum about 0.5 x as long as wide. Pronotum is 3.6 times shorter than elytron. Pronotum without angularity, narrowed anteriorly, parallel-sided from middle to base. Lateral margin without teeth. Basal margin with middle lobe, with basal furrow. Punctures of disk separated by about 2/3 diameter, disk of basal portion without microsculpture. Elytra about 1.7 x as long as combined width. Elytral punctures separated by 1.5 diameter. Humeral tooth absent. The maximum width of the elytra is located behind the middle.

Disk of metasternum punctured, punctures separated by 1.5 diameter; small areas near the posterior coxae are smooth, without punctures.

Pro-, meso- and metatibia with two short spurs on apex. Length of pro- and mesotibial spur less than 1/3 width of tibia in apex; length of metatibial spur less than 1/6 width of metatibia in apex. Apex of all tibia with crown of setae. Tarsomeres 1–3 of pro-, meso- and metatarsi weakly dilated; 4th segment almost not expanded. Small lobes on top of long bristles. Claws of tarsi curved, without notches.

Ventrite 1–5 length ratio: 22:11:7:5:6. Ventrites smooth, with weak pubescence on the back margin, weakly punctured, distance between punctures = 2 diameter.

ETYMOLOGY. The name is given in honor of Christel Hoffeins.

REMARKS. The genus *Spaniophagus* **gen.n.** differs from the other genera of the tribe Cryptophagini by several characters common to *Spaniophaenus:* lateral margin of pronotum not modified; very long ventrite 1, longer than remaining ventrites; basal pits absent; basal groove absent. On the other hand, the genus *Spaniophaenus* is among the modern genera in sister relation with the genus *Catopochrotus*. Perhaps the new genus belongs to the same group of genera.

Discussion

Some genera of Cryptophagidae live in nests of social Hymenoptera, birds and mammals [Leschen, 1999]. *Spaniophagus* **gen.n.** is sister taxon to the genus *Spaniophaenus*. *Spaniophaenus* lives in ant and termite nests, under rocks, and in bird nests. *Spaniophaenus* is sister taxon to the *Catopochrotus* Reitter, 1889 from modern fauna; *Catopochrotus* can be also an inquiline in ant nests (*Crematogaster* Lund, 1831). *Crematogaster* ants still not found in Baltic amber [Dubovikoff, pers. comm., 2019]; published Baltic record [Perkovsky, 2016] was based on the specimen from copal, deposited in Zoological Institute RAS (StPetersburg). At the same time undisputed *Crematogaster* is described from Rovno amber [Radchenko, Dlussky, 2019], so it is very possible that described beetle was an inquiline as well. Probably a new genus also lived in the nests of ants.

The modern genera *Spaniophaenus* and *Catopochrotus* are saprophagous [Leschen, 1996]. Perhaps

Spaniophagus **gen.n.** was also the saprophagous. This is likely explained in part by the lack of a major dietary or habitat shift in myrmecophilous species compared to their free-living ancestors. Similarity in diet has been implicated previously in the evolution of social insect inquilinism in mycophagous Cryptophagidae,

5

6

Figs 5–6. *Spaniophagus hoffeinsae* **gen.** et **sp.n.** Holotype (inv. No CCHH 824-4 from the collection of the Senckenberg Deutsches Entomologisches Institut, Müncheberg, Germany (SDEI)): 5 — lateral margin of pronotum; 6 — legs.

Рис. 5–6. *Spaniophagus hoffeinsae* **gen.** et **sp.n.** Голотип (inv. No CCHH 824-4 в коллекции Senckenberg Deutsches Entomologisches Institut, Müncheberg, Germany (SDEI)): 5 — боковой край переднеспинки; 6 — ноги.

Fig. 7. Drawing of ventral view, *Spaniophagus hoffeinsae* **gen.** et **sp.n.**

Рис. 7. Рисунок вентральной стороны *Spaniophagus hoffeinsae* **gen.** et **sp.n.**

where the decaying nest debris and refuse piles used by myrmecophilous species are little different from the habitats used by free-living relatives [Leschen, 1999; Parker, 2016].

The closest genera for *Spaniophagus* **gen.n.** are *Spaniophaenus* and *Catopochrotus*. *Spaniophaenus* is spread in the Western Palaearctic (Europe: Spain, France, Romania, Crimea and Caucasus) [Otero, Diaz Pazos, 1995], and also found in the Himalayas [India, Himachal Pradesh: Lyubarsky, 1997]. *Catopochrotus* is spread in Caucasus, Elton and Köpetdag (Bol'shaya Samaroda river, Volgograd area; Maykop, Adygea; Gori, Georgia; Ganja, Azerbaijan; Magtymguly, Turkmenistan). The only species of this genus is named for the ant, in the nests of which this beetle occurs: *Catopochrotus crematogastri* Reitter, 1889. In the light of these facts, finding *Spaniophagus* **gen.n.** in Baltic amber is not unexpected. *Spaniophaenus* can be wingless and winged, *Catopochrotus* has fully developed wings. It can be assumed that the extinct *Spaniophagus* **gen.n.** also had fully developed wings and was capable of flying.

Within Palearctic region, ants of the genus *Crematogaster* inhabit almost exclusively arid and semiarid areas, including both the open landscapes and dry forests [Radchenko, 2016]. Probably a new genus also lived in the nests of ants, possibly it was myrmecophilic — at least 137 ant species are known from Baltic amber [Perkovsky, 2016; Radchenko, Perkovsky, 2019]. If *Spaniophagus* **gen.n.** was related to ants ecologically similar to *Crematogaster*, than its rarity at the Baltic amber becomes understandable: such environments are more commom for the Rovno amber forest [Lyubarsky, Perkovsky, 2012 and references herein].

This is the first extinct genus from family Cryptophagidae, described from the Eocene. All other Eocene records belong to extant genera.

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