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† *Electruphilus wendeli* gen.n., sp.n. — the first diving beetle recorded from Saxonian (Bitterfeld) Amber (Coleoptera: Dytiscidae: Laccophilinae)

† *Electruphilus wendeli* gen.n., sp.n. — первый вид плавунцов из Саксонского (Bitterfeld) янтаря (Coleoptera: Dytiscidae: Laccophilinae)

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KEY WORDS. Dytiscidae, Laccophilinae, new genus, new species, amber, Bitterfeld.
КЛЮЧЕВЫЕ СЛОВА. Dytiscidae, Laccophilinae, новый род, новый вид, янтарь, Bitterfeld.

ABSTRACT. We provide the first report of a diving beetle (Coleoptera, Dytiscidae) from Saxonian (Bitterfeld) Amber. Based on a male specimen, collected in "Friedersdorfer Bernsteinschluff (Friedersdorf amber silt)" from the Cottbus Formation near Bitterfeld, Saxonia, Germany, †*Electruphilus* **gen.n.** †*wendeli* **sp.n.** is described. The new genus belongs to the subfamily Laccophilinae Gistel, 1848 and resembles species of *Laccodytes* Régimbart, 1895; however, all species of *Laccodytes* have the suture between elytron and epipleuron very well visible dorsally, which is not the case in †*Electruphilus* **gen.n.** Furthermore, the new genus is compared with the extant genera *Australphilus* Watts, 1978, *Philaccolus* Guignot, 1937 and *Africophilus* Guignot, 1948. We also provide a modified key to the Laccophilinae genera of the World, as we found minor errors or ambiguities in a recent key.

РЕЗЮМЕ. Представлены первые сведения о плавунцах (Coleoptera: Dytiscidae) из саксонского янтаря. † *Electruphilus* **gen.n.** † *wendeli* **sp.n.** описан по одному самцу, собранному в «Friedersdorfer Bernsteinschluff» из коттбусской свиты близ Биттерфельда, Саксония, Германия. Новый род относится к подсемейству Laccophilinae Gistel, 1848 и напоминает виды *Laccodytes* Régimbart, 1895; однако, у всех *Laccodytes* шов между надкрыльями и эпиплейроном хорошо виден дорсально, в отличие от † *Electruphilus* **gen.n.** Кроме того, новый род сравнивается с родами *Australphilus* Watts, 1978, Philaccolus Guignot, 1937 и *Africophilus* Guignot, 1948. Предложен модифицированный ключ для родов Laccophilinae мировой фауны, так как были выявлены небольшие ошибки или неясности в последнем определителе.

Introduction

Diving beetles are rarely reported from amber. Described species include representatives of the subfamilies Agabinae (placed in: *Hydrotrupes* Sharp, 1882 — Baltic amber; Holarctic), Copelatinae (*Copelatus* Erichson, 1832 — Baltic and Dominican amber; mostly Pantropical extant distribution), Dytiscinae († *Ambarticus* Yang *et al*., 2019 — Burmese amber), Hydroporinae (*Hydroporus* Clairville, 1806 — Baltic amber; Holarctic; *Derovatellus* Sharp, 1882 — Baltic amber; Pantropical extant distribution), and Laccophilinae (*Japanolaccophilus* Satô, 1972 — Baltic amber; Japan) [Klausnitzer, 2003; Miller, Balke, 2003; Balke et al., 2010; Gómez, Damgaard, 2014; Balke, Hendrich, 2019; Yang et al., 2019].

Here, we provide the first report of a diving beetle from Saxonian (Bitterfeld) amber. It is assumed that Baltic and Bitterfeld are distinct deposits [Wolfe et al., 2016], and possibly of the same age [Wolfe et al., 2016], but caution appears warranted as amber cannot be dated directly but only from the deposits it is being recovered from. A detailed discussion of Bitterfeld amber also in relation to Baltic amber was presented by Dunlop et al. [2018].

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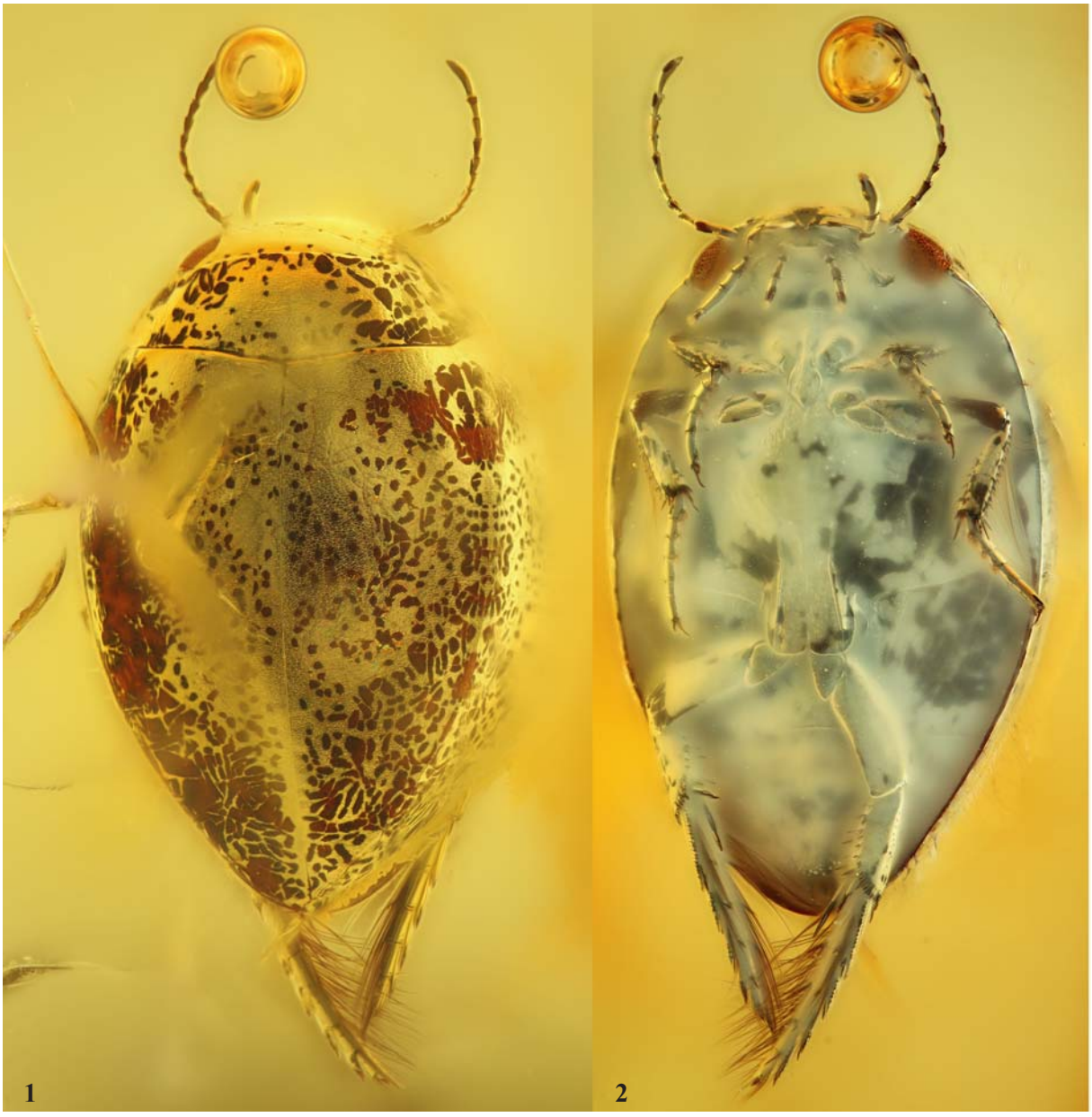
The new species is a specimen well preserved, clearly belonging to the subfamily Laccophilinae Gistel, 1848, the second known representative of this subfamily in amber. Extant Laccophilinae consist of two tribes with 14 genera and about 450 species, half of which belong to the large worldwide genus *Laccophilus* Leach [Nilsson, Hajek, 2019]. Roughly half of the Laccophilinae species are either strictly lotic, or to some degree associated with running waters, and the other half are related to lentic or stagnant waters. *Japanolaccophilus beatificus* Balke, Hendrich, 2019, is the first described fossil Laccophilinae from amber (Baltic amber). Remarkably, that genus has only one extant species, the running water *Japanolaccophilus niponensis* Kamiya, 1939 in Japan. The specimen described here is clearly different from *J. beatificus* and more than that, generic assignment was not without ambiguity.

Materials and methods

The beetles were studied with a Leica M205C stereo microscope at 10–160x. Photographs were taken with a digital imaging system composed of a Canon 5DS camera with Nikon bellows, and 5–20x ELWD Plan Apo objectives attached to a Mitutoyo focus lens. Image stacks were generated using the Stackmaster macro rail (Stonemaster), and images were then assembled with the computer software Helicon Focus 4.77TM.



Figs 1–2. †*Electruphilus wendeli* **gen.n., sp.n.**: 1 — dorsal habitus; 2 — ventral habitus.
Рис. 1–2. †*Electruphilus wendeli* **gen.n., sp.n.**: 1 — сверху; 2 снизу.

Taxonomy

The Bitterfeld specimen was assigned to the subfamily Laccophilinae: tribe Laccophilini due to the presence of distinctly lobed posterolateral margins of metatarsomeres I–IV, and less so V.

However, we were not able to unambiguously assign the Bitterfeld specimen to a known genus. Laccophilinae genera remain in need of comprehensive phylogenetic investigation to establish apomorphic characters for its genera. To date, the genera are usually diagnosed by a combination of characters, which individually might well occur in more than one genus. In fact, even characters that were thought to diagnose Laccophilinae genera well have been shown to possibly be reversed in certain species (e.g. >280 species of *Laccophilus* assigned to that genus by bifid metatibial spurs, except for a New Guinea species [Balke et al., 1997]).

Family Dytiscidae Leach, 1815
Subfamily Laccophilinae Gistel, 1848
Tribe Laccophilini Gistel, 1848

† *Electruphilus* Balke, Toledo et Hendrich, **gen.n.**
Figs 1–8.

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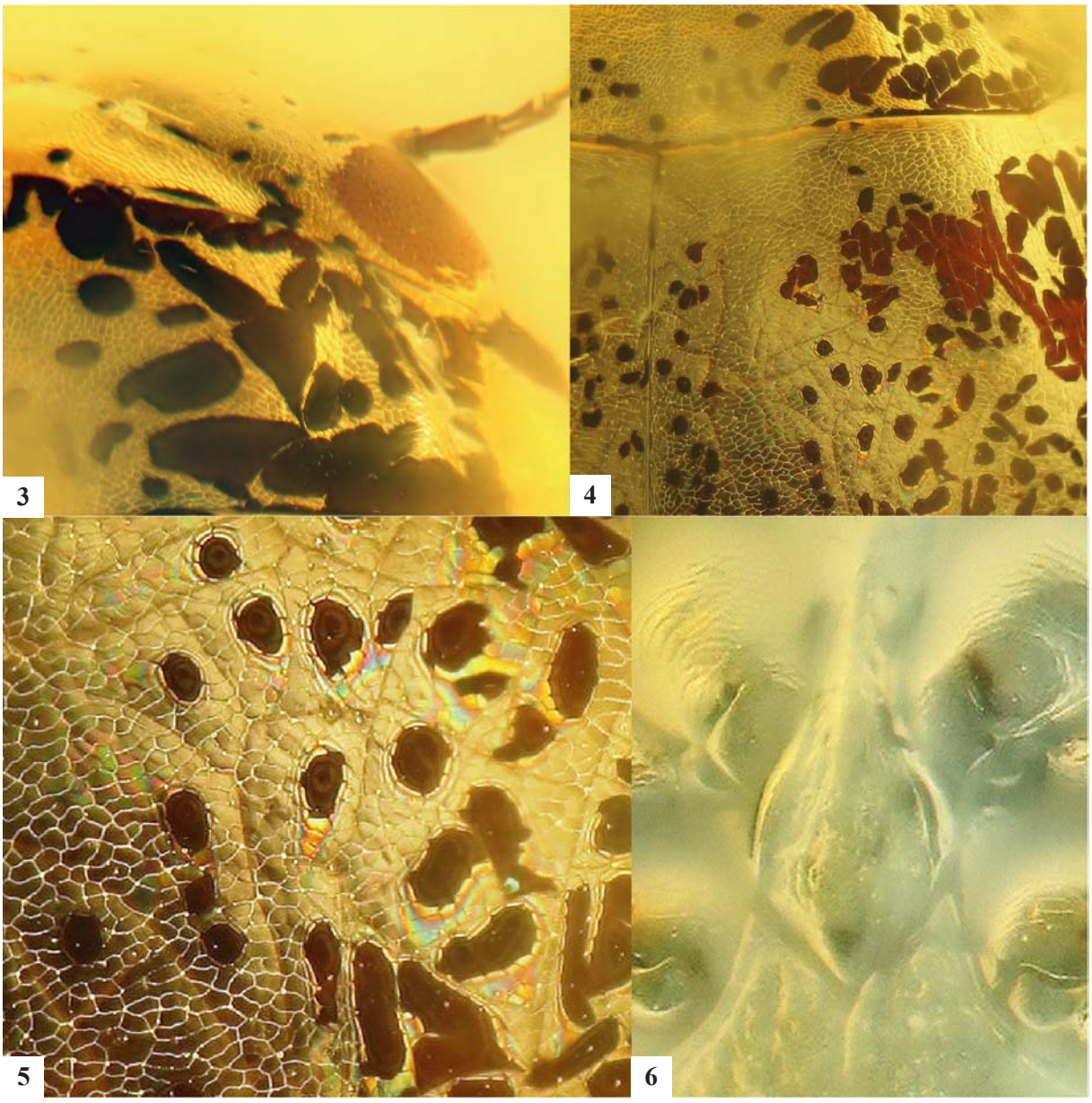

Figs 3–6. †*Electruphilus wendeli* **gen.n., sp.n.**: 3 — surface sculpture of head and anterior half of pronotum; 4 — surface sculpture of pronotal base and elytron; 5 — detail of surface sculpture of elytron; 6 — prosternal process and metasternal process.

Рис. 3–6. †*Electruphilus wendeli* **gen.n., sp.n.**: 3 — скульптура головы и передней части переднеспинки; 4 — скульптруа основания переднеспинки и надкрылий; 5 — детали скульптуры надкрылий; 6 — переднегрудной и заднегрудной отростки.

TYPE SPECIES: †*Electruphilus wendeli* Balke, Toledo, Hendrich, 2019, by present designation.

ETYMOLOGY. Derived from the Latin noun "electrum" meaning amber, and "-philus", here in reminiscence of the genus name *Laccophilus*, and other Laccophilinae genera with the same ending.

DIAGNOSIS. Small beetle, total length about 2.7 mm, body oval, tear-shaped (Figs 1–2). Pronotum with hind margin almost straight, and hind angles broadly rounded; suture between elytron and epipleuron not visible dorsally; prosternal process broadened, somewhat deltoid, with rather obtuse tip, not exceeding in length the mesocoxal cavities (Figs 2, 6); metatibia with two simple spurs (not bifid); metacoxal lines straight, only slightly converging; hind margin of metacoxal processes truncate with lobes separated by a narrow but visible medial V-shaped notch (Figs 2, 7). Fore and middle legs slender, with long tarsi. Metatibial spurs simple, not bifid apically; metatarsi distinctly but not broadly lobed. Male with pro- and mesotarsi not dilated, bearing 4 rows of stalked suction palettes (Fig. 8).

† *Electruphilus wendeli*
Balke, Toledo et Hendrich, **sp.n.**
Figs 1–8.

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TYPE LOCALITY. Germany, Saxonia-Anhalt, Bitterfeld.

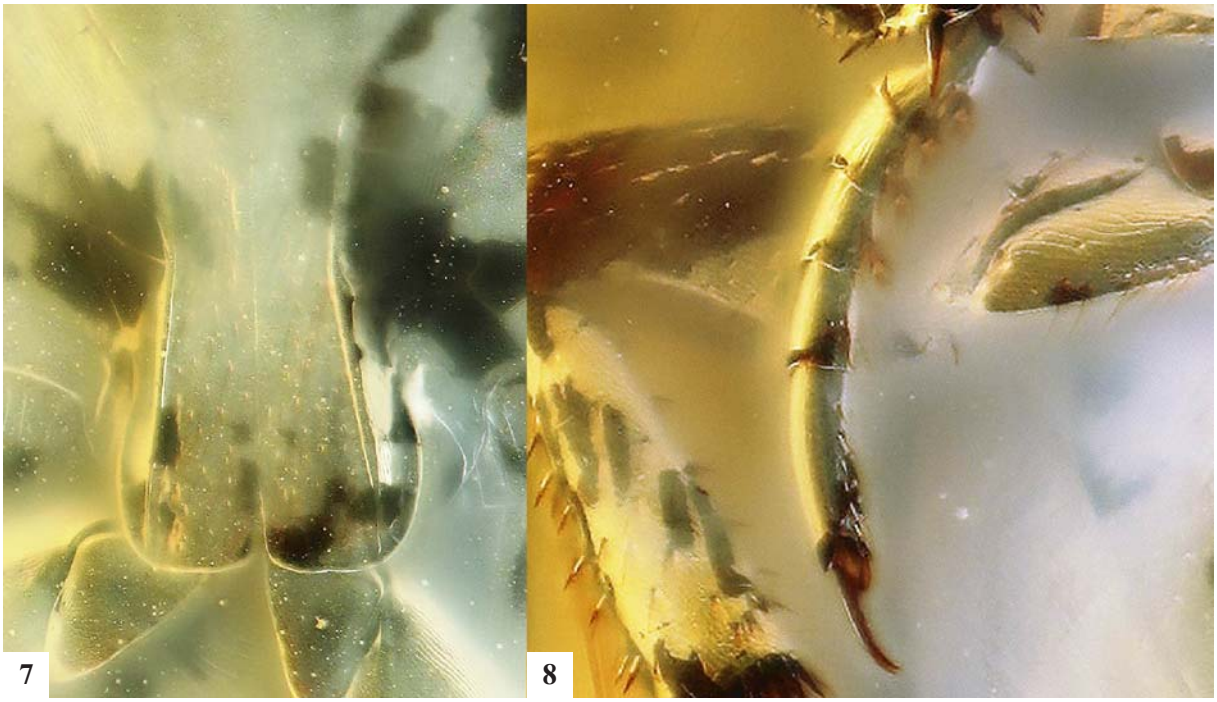
AGE OF FOSSIL. "Bernsteinschluff" from the Cottbus Formation near Bitterfeld town, the sediments are possibly of the same age as Baltic amber, which is middle Eocene (Lutetian Stage; 41.3–47.8 Ma) [Wolfe et al., 2016].

MATERIAL. Holotype male. Bitterfeld amber (Coll. Goitzsche Bernstein GmbH), red printed type label in the specimen box: "HOLOTYPE † *Electruphilus wendeli* **sp.n.** Balke, Toledo & Hendrich, des. 2019".

DESCRIPTION. Beetle oval, tear shaped (Figs 1–2); length of beetle without head about 2.5 mm, with head about 2.7 mm; greatest width about 1.7 mm.

Colouration. Traces of colouration are visible on both dorsal and ventral surface (Figs 1–4). Colouration on head almost completely lost except for few small dark brown spots; pronotum with more numerous, rather uniformly dark brown fragments. Colouration on elytra better preserved, suggesting a pattern of dark marmorisation on a reddish-brown background; this is more evident on lateral side of left elytron and on latero-basal position of right elytron. Ventral surface mostly covered by glossy yellowish glaze, except for part of metaventrite and first ventrites of right side of abdomen, which are apparently dark brown; mesofemorae and mesotibiae dark brown.

Structures. Antenna filiform (Figs 1–2). Hind margin of pronotum almost straight, slightly concave in the middle; hind angles broadly rounded. Suture between elytron and epipleuron not visible dorsally, that means the elytron does not appear laterally bordered. Venter (Fig. 2): Prosternal process with rather obtuse tip exceeding to shortly before hind margins of procoxae, broadened, somewhat deltoid, with broad margin, ridge broadly rounded, not keeled (Figs 2– 6). Prosternal ridge moderately sharp (Fig. 6). Metaventrite not well visible, lateral "wings" apparently narrow. No stridulatory files seem to occur on metacoxae. Metacoxal lines straight, only slightly converging, hind margin of metacoxal processes truncate with lobes separated by a narrow but visible medial V-shaped notch (Figs 2, 7). Last sternite apparently not modified, apically rounded. Pro- (Fig. 8) and



Figs 7–8. †*Electruphilus wendeli* **gen.n., sp.n.**: ; 7 — metacoxal process and metacoxal lines; 8 — detail of right protarsus and right mesotibia.

Рис. 7–8. †*Electruphilus wendeli* **gen.n., sp.n.**: ; 7 — отросток заднегруди и метакоксальные линии; 8 — строение правой передней лапки и средней голени.

mesotarsi (Fig. 2) long and slender, not dilated, with tarsomeres I–IV almost of the same length and fifth slightly longer than third and fourth together. Pro- and mesotarsomeres altogether with 4 rows of small stalked suction palettes (two rows on I, one row on II and III), each row with no more than 2 or 3 visible palettes (Fig. 8); pro- and mesotarsal claws not modified and equal.

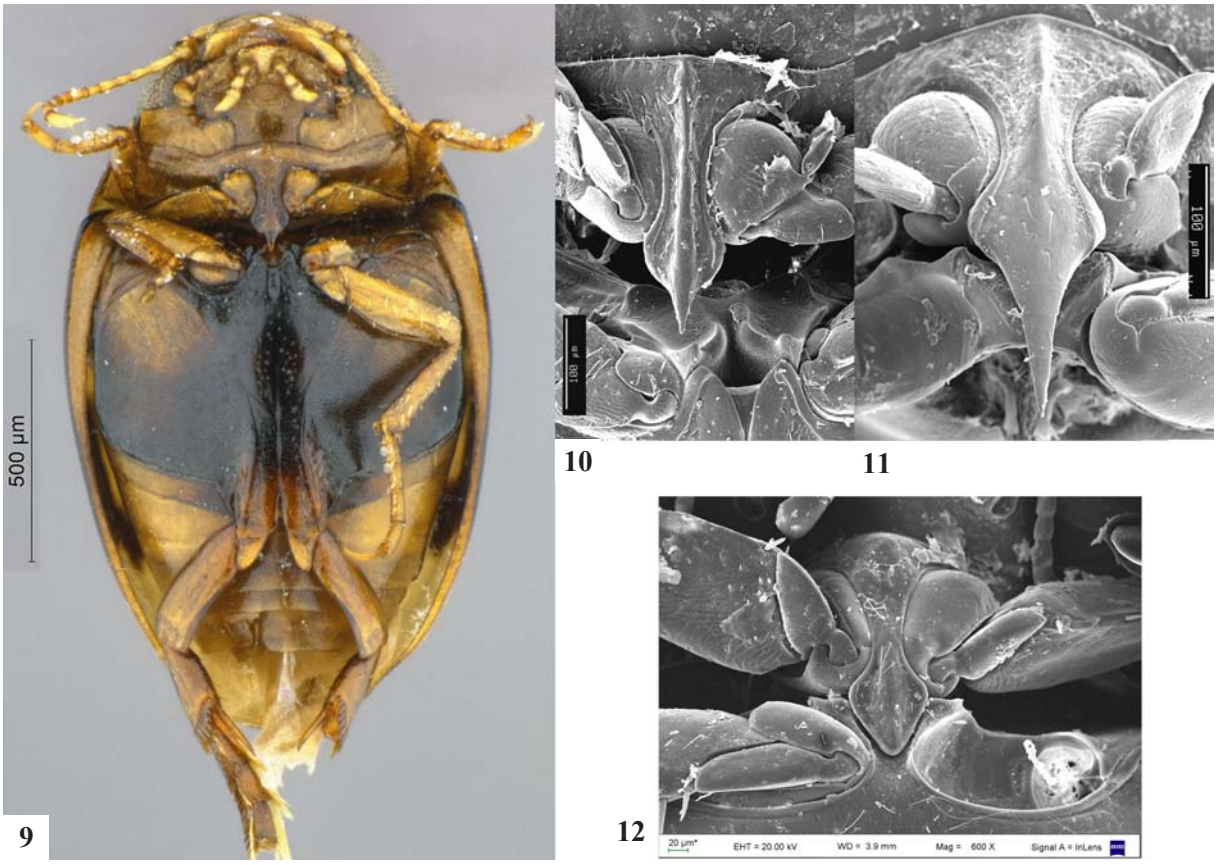
Surface sculpture. The dorsal surface shows irregular dark spots (Figs 1–3) which, on closer inspection, appear crater or pore like structures (Fig. 5) which are an artefact perhaps due to microbial activity during the earlier inclusion phase. Head with regular polygonal meshes, punctation not visible (Fig. 3). Pronotum with regular polygonal meshes, punctation not obvious, fine and sparse at most (Figs 1, 4). Elytron with less regular and rather larger polygonal meshes and fine punctation (Figs 1, 4–5). Space between metacoxa with coarse and sparse punctures (Figs 2, 7). Metacoxa and abdominal sternites obscured. Surface of metasternal process (surface caudad of the prosternal process) appearing rough due to presence of larger dots / grooves. Metacoxa with diagonal lines. All femora and tibiae lacking very obvious punctation.

Genitalia. Genital capsule present, as inferred from the visibility of what we interpret as the tip of the median lobe (Fig. 2).

ETYMOLOGY. Named in honour of Andreas Wendel, a collector of Bitterfeld amber inclusions. He has made great efforts to establish the new amber mining from the Goitzsche lake, the origin of the beetles described here.

COMPARATIVE NOTES. As mentioned in the introduction, although likely contemporary, the Bitterfeld specimen is very different from the Baltic *Japanolaccophilus beatificus* Balke, Hendrich, 2019, at least at species level. The latter is larger, with different dorsal reticulation and dense punctuation on elytra, suture between elytron and epipleuron visible dorsally and fore and middle legs coarsely punctate on femora and tibiae. Unfortunately, the ventral features of *J. beatificus* are poorly visible and it is hard to make further comparisons with the better-preserved fossil from the Saxonian deposits. The only extant species of *Japanolaccophilus*, *J. niponensis* Kamiya, 1939, is also a larger beetle, with peculiar parallel metacoxal lines, coarsely punctuate fore and middle legs and a visible elytron-epipleuron suture in dorsal sight.

Compared to other known Laccophilini genera, in terms of size, body shape and long and slender pro- and mesotarsi, the Bitterfeld specimen resembles species of the Neotropical *Laccodytes* Régimbart, 1895 (Figs 9–11), a very diverse genus in terms of morphological structures [Toledo et al., 2010] that are usually being used to diagnose genera, such as shape and



9 10 11 12

Figs 9–12. *Laccodytes* spp.: 9 — *L. takutuanus* Toledo et al., 2010; 10 — *L. neblinae* Toledo et al., 2010; 11 — *L. apalodes* Guignot, 1955; 12 — *Laccomimus bordoni* Toledo, Michat, 2015; 9 — male, ventral view (photo by Cesar Benetti); 10–12 — SEM photo of prosternal process [from Toledo, Michat, 2015].

Рис. 9–12. *Laccodytes* spp.: 9 — *L. takutuanus* Toledo et al., 2010; 10 — *L. neblinae* Toledo et al., 2010; 11 — *L. apalodes* Guignot, 1955; 12 — *Laccomimus bordoni* Toledo, Michat, 2015; 9 — самец, снизу (photo by Cesar Benetti); 10–12 — SEM фотография отростка переднегруди [по Toledo, Michat, 2015].

length of prosternal process, shape of hind angle of pronotum, curvature of middle of pronotal base, and shape of hind margin of metacoxal processes [Toledo, Michat, 2015]. However, all species of *Laccodytes* have the suture between elytron and epipleuron very well visible dorsally and this is not the case in the amber inclusion. All *Laccodytes*, hence, have a different elytral sculpture, a remarkably different shape of prosternal process as well, though variable between the species of this genus (Figs 9–11) and, only one pair of stalked suction palettes on the first segment of male pro- and mesotarsi. The shape of the metacoxal process in the present fossil resembles the structure occurring in some species of *Laccodytes*, though the slightly stronger punctuation between the metacoxal lines do more reflect the situation in the Australian genus *Australphilus* Watts, 1978 (Figs 14, 16), as well as the rough surface of metasternal process, although it seems that the rest of metaventrite is smooth, being the contrary of *Australphilus*. The broad, short and broadly margined prosternal process of the new genus looks rather similar to that of *Laccomimus* Toledo, Michat, 2015 or *Laccosternus* Brancucci, 1983, but in these genera this structure is somewhat arrow-shaped (Fig. 12), whilst in † *Electruphilus* gen. n. it is more tear-shaped (Fig. 6) whereas, regarding other characters, the new genus is obviously poorly related with *Laccomimus* and *Laccosternus*.

Figs 13–17. Laccophilinae: 13–14, 16 — *Australphilus saltus* Watts, 1978; 15, 17 — *Philaccolilus ameliae* Balke et al., 2000; 13 — dorsal side; 14–15 — ventral side; 16–17 — metacoxae and metacoxal lines.

Рис. 13–17. Laccophilinae: 13–14, 16 — *Australphilus saltus* Watts, 1978; 15, 17 — *Philaccolilus ameliae* Balke et al., 2000; 13 — сверху; 14–15 — снизу; 16–17 — задние тазики и метакоксальная линия.

† *Laccophilus strigatus* (Schlechtendal, 1894), originally described in the genus *Palaeogyrinus* Schlechtendal, 1894 from Miocene deposits of Germany (see Galewski, Głazek, 1978; Prokin, Dong, 2010; Nilsson, Hajek, 2019) differs from other Laccophilinae by sulcate elytra and does not share close relationships with † *Electruphilus* **gen.n.**

TAXONOMY AND BIOGEOGRAPHY. The lack of a phylogenetic inference for Laccophilinae does not permit an unambiguous placement of the Saxonian amber specimen and, thus, it is not possible to provide a formal biogeographic analysis here. Likely † *Electruphilus* **gen.n.** represents an ancient lineage of Laccophilini within which it seems rather difficult to find close affinities with extant genera. We merely point out that there is a possibility that † *Electruphilus* **gen.n.** and *Laccodytes* might be closely related or sister taxa. Such a case of a Baltic amber fossil († *Euroleptochromus* Jałoszyński, 2012) and an extant Neotropical sister group was suggested by Jałoszyński [2012] in a clade of Coleoptera, Staphylinidae, Scydmaeninae. Pütz et al. [2004] discussed a similar scenario for an extinct Baltic Coleoptera: Limnichidae († *Palaeoersachus* Pütz et al., 2004). Other such cases are summarized in the very detailed review of Eocene amber beetles by Alekseev [2017]. One possible explanation for such a distribution pattern might be a range expansion via trans Beringian dispersal e.g. in the Eocene, before the onset of cooling of the higher latitudes of the northern hemisphere towards the Oligocene (see Pütz et al. [2004] and references therein; as well as Alekseev [2017]).

Annotated key to Laccophilinae genera

(based on Toledo and Michat [2015] as modified by Balke and Hendrich [2019]) (annotations, additions and corrections underlined).

NOTE: The well illustrated key by Miller and Bergsten [2016] relies basically on the same characters as Toledo and Michat [2015].

1. Metatibiae with a single apical spur; antennal segments enlarged and flattened in male. Neotropical ..... ***Napodytes***
— Metatibiae with 2 apical spurs; antennal segments never enlarged or flattened in male 2
2. Suture between elytron and epipleuron very well visible dorsally (= "lateral sides bordered": in dorsal view elytra visibly outlined by a fine border along outer lateral side) 3
— Suture between elytron and epipleuron not visible dorsally (= "lateral sides not bordered": in dorsal view the elytra do not appear to be bordered) or suture visible only apically (in New Guinea genus *Philaccolilus*) 6
3. Hind angles of pronotum rounded; prosternal process shorter, not extending beyond mesacoxae (Figs 9–10). 4
— Hind angles of pronotum extending posteriorly into acuminate spine; prosternal process long, extending beyond mesocoxae (Fig. 11). 5
4. Base of pronotum projecting hindwards in a distinct angle at middle; pro and mesotibia and femur at most with fine punctation. Neotropical ..... ***Laccodytes phalacroides*-group**
— Base of pronotum straight or almost so; fore and middle tibia and femur with dense, coarse punctation. Palearctic ..... ***Japanolaccophilus***
5. Prosternal process trifid; posterolateral lobes of metatarsi very short, almost lacking; apex of elytra rounded. Afrotropical and Oriental ..... ***Neptosternus***
— Prosternal process simple (Fig. 11); posterolateral lobes of metatarsi longer, well developed; apex of elytra truncated. Neotropical ..... ***Laccodytes apalodes*-group**
6. Metatibial spurs bifid apically [except in *L. bapak* Balke, Larson, Hendrich, 1997 from Papua New Guinea]. Worldwide ..... ***Laccophilus***
— Metatibial spurs simple, apically acute. 7
7. Base of pronotum projecting hindwards in a distinct angle at middle. 8
— Base of pronotum straight or almost so. 11
8. Prosternal process laterally compressed behind procoxae 9
— Prosternal process fairly broad behind procoxae 10
9. Length not exceeding 5 mm; pro- and mesofemora and tibiae densely punctate; prosternal process markedly carinate. Tibet ..... ***Laccoporus***
— Length exceeding 5 mm; pro- and mesofemora and tibiae never densely punctate; prosternal process slightly carinate. Africa ..... ***Philodytes***
10. Mesotibial spurs not longer than segments 1–2 of mesotarsi combined; elytra covered by numerous, more or less impressed punctures. Oriental ..... ***Laccosternus***
— Mesotibial spurs longer than segments 1–4 of mesotarsi combined; elytra lacking punctures, at most bearing very few, small, hardly visible punctures. Neotropical and SE Nearctic ..... ***Laccomimus***
11. Reticulation on elytra consisting of longitudinal or broad polygonal meshes; metacoxal lines fairly parallel. Afrotropical ..... ***Africophilus***
— Reticulation on elytra consisting of small, transversal meshes; metacoxal lines more or less convergent anteriorly 12
12. Space between metacoxal lines with numerous coarse setiferous punctures; metacoxal processes, distally bilobed. Australia ..... ***Australphilus*** (Figs 13–14, 16)
— Space between metacoxal lines not with such setiferous punctures; metacoxal processes distally not bilobed ... 13
13. Metacoxal lines slightly converging (Fig. 2) .... † ***Electruphilus* gen.n.** (Figs 1–8)
— Metacoxal lines strongly converging (Figs 15, 17). .. 14
14. Metacoxa with stridulatory file; posterolatral lobes of metatarsi short; ventrite 6 in females rounded apically. Afrotropical ..... ***Philaccolus***
— Metacoxa lacking stridulatory file; posterolateral lobes of metatarsi very long; ventrite 6 in females with an apical lobe, more or less developed. Papua New Guinea ..... ***Philaccolilus*** (Figs 15, 17)

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References

Alekseev V.I. 2017. Coleoptera from the middle-upper Eocene European ambers: generic composition, zoogeography and climatic implications // Zootaxa. Vol.4290. No.3. P.401–443.

Balke M., Hendrich L. 2019. †*Japanolaccophilus beatificus* sp. nov. from Baltic Amber and a key to the Laccophilinae genera of the World (Coleoptera: Laccophilinae) // Zootaxa. Vol.4567. No.1. P.176–182.

Balke M., Larson D.J., Hendrich L. 1997. A review of the New Guinea species of *Laccophilus* Leach 1815 with notes on region-

al melanism (Coleoptera Dytiscidae) // Tropical Zoology. Vol.10. No.2. P.295–320.

Balke M., Beigel A., Hendrich L. 2010. *Hydroporus carstengroehni* sp.n. und zwei unbestimmte Hydroporinae aus dem baltischen Bernstein (Dytiscidae: Hydroporinae) // Nachrichtenblatt der bayerischen Entomologen. Bd.59. S.2–9.

Dunlop J.A., Kotthoff U., Hammel J.U., Ahrens J., Harms D. 2018. Arachnids in Bitterfeld amber: A unique fauna of fossils from the heart of Europe or simply old friends? // Evolutionary Systematics. Vol.2. No.1. P.31–44.

Galewski K., Głazek J. 1977. Upper Miocene Dytiscidae (Coleoptera) from Przeworno (Lower Silesia) and the Problem of Dytiscidae Evolution // Bulletin de l'Académie polonaise des sciences. Série des sciences biologiques. Vol.25. P.781–789.

Gómez R.A., Damgaard A.L. 2014. A rare diving beetle from Baltic Amber: *Hydrotrupes prometheus* new species reveals former widespread distribution of the genus (Coleoptera, Dytiscidae) // Journal of Palaeontology. Vol.88. No.4. P.814–822.

Jałoszyński P. 2012. Description of *Euroleptochromus* gen. n. (Coleoptera, Staphylinidae, Scydmaeninae) from Baltic amber, with discussion of biogeography and mouthpart evolution within Clidicini // Systematic Entomology. Vol.37. No.2. P.346–359.

Klausnitzer B. 2003. Käferlarven (Insecta: Coleoptera) in Baltischen Bernstein — Möglichkeiten und Grenzen der Bestimmung // Entomologische Abhandlungen. Vol.61. No. 1. P.103–108.

Miller K.B., Balke M. 2003. The unusual occurrence of water beetles in amber: *Copelatus aphroditae* Balke n. sp. and *C. predaveterus* Miller n. sp. (Coleoptera: Dytiscidae: Copelatinae) // Proceedings of the Entomological Society of Washington. Vol.105. P.809–815.

Miller K.B., Bergsten J. 2016. Diving beetles of the world. Systematics and biology of the Dytiscidae. Baltimore: Johns Hopkins University Press. 320 pp.

Nilsson A.N., Hájek J. 2019. A world catalogue of the family Dytiscidae (Coleoptera, Adephaga). 307 pp. Internet version 1.I.2019. Available from: http://www.waterbeetles.eu.

Prokin A.A., Dong R. 2010. New mesozoic diving beetles (Coleoptera, Dytiscidae) from China // Paleontological Journal. Vol.44. No.5. P.526–533.

Pütz A., Hernando C., Ribera I. 2004. A new genus of Limnichidae (Coleoptera) from Baltic amber // Insect Systematics & Evolution. Vol.35. No.3. P.329–334.

Toledo M., Michat M.C. 2015. Description of *Laccomimus* gen. n. and eleven new species from the Neotropical region (Coleoptera, Dytiscidae, Laccophilinae) // Zootaxa. Vol.3990. No.3. P.301–354. doi.org/10.11646/zootaxa.3990.3.1.

Toledo M., Spangler P.J., Balke M. 2010. Taxonomic revision of the Neotropical diving beetle genus *Laccodytes* Régimbart, 1895 (Coleoptera: Dytiscidae) // Zootaxa. Vol. 2347. No.1. P.37–58.

Wolfe A.P., McKellar R.C., Tappert R., Sodhi R.N., Muehlenbachs K. 2016. Bitterfeld amber is not Baltic amber: Three geochemical tests and further constraints on the botanical affinities of succinite // Review of Palaeobotany and Palynology. Vol.225. P.21–32.

Yang Q., Chen Z.-Y., Jia F.J. 2019. *Ambarticus myanmaricus* gen. et sp. nov., the first diving beetle from mid-Cretaceous amber of northern Myanmar (Coleoptera, Dytiscidae, Dytiscinae) // Cretaceous Research. Vol.102. P.1–6.