

## Two new weevil genera of the family Brentidae (Coleoptera) in Baltic amber

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Two new genera and two new species, *Baltocyba* **gen. n.** (type species: *B. electrinus* **sp. n.**) and *Baltonanophyes* **gen. n.** (type species: *B. crassirostre* **sp. n.**), and two new species, *Baltocyba electrinus* **sp. n.** and *Baltonanophyes crassirostre* **sp. n.**, from the Baltic amber are described and illustrated. The genus *Archinvolvulus* Voss, 1972, **placem. n.** is transferred from the tribe Rhadino-cybini to the tribe Notapionini.

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### 1. Introduction

Weevils of the family Brentidae include about 4,400 species in the recent fauna (Oberprieler 2014a). The earliest known brentid subfamily Eurhynchinae was described from the Aptian–Albian of Santana in Brazil (Zherikhin & Grachev 2004). Recent forms of this subfamily live in Australia and New Guinea (Oberprieler 2014b). The most ancient Apioninae is known from the Turonian of Kzyl-Dzhar in Kazakhstan (Legalov 2014). Representatives of the subfamily Apioninae are also known from the Paleocene of the Primorski Region (Legalov 2015b), the Eocene French and Baltic ambers (Kirejtshuk *et al.* 2015, Legalov 2015b, Legalov & Bukejs 2015), Middle Eocene of Green River (Scudder 1893, Legalov 2018c), terminal Eocene of Florissant (Scudder 1893, Legalov 2013, 2015a), Miocene Dominican amber (Poinar & Legalov 2015) and several Oligocene and Miocene European and Chinese locations (Legalov 2015b). Modern Apioninae are known everywhere. The earliest member of Nanophyinae was described from the

early-Middle Eocene of the Green River (Legalov 2015a) and was recorded also from Late Eocene in Baltic amber (Klebs 1910). Three species of the subfamily has been described only from the Eocene of USA and France (Théobald 1937, Legalov 2015b) and Oligocene of Germany (Heyden & Heyden 1866). Currently weevils of Nanophyinae occur in Holarctic, Oriental, Ethiopian and Australian Regions (Alonso-Zarazaga 2014).

The oldest Brentinae are known from the Middle Eocene of Germany (Messel and Maar) (Lutz 1990, Tröster 1993, Wappler 2003) and its representatives have been described from the early-Middle Miocene Dominican amber (Poinar 2009). Now its representatives occur widespread in tropical regions. The fossil Cyladinae weevils were recently described from the Middle Miocene of Öhningen (Germany) (Legalov 2018a). The representatives of that subfamily currently live in the Oriental and Ethiopian Regions, and *Cylas formicarius* (Fabricius, 1798) was introduced to the New World (Alonso-Zarazaga & Lyal 1999).

Two new genera with a new species in each, representing subfamilies Apioninae and Nanoxyinae in the weevil family Brentidae, found in the Baltic amber, are here described for the first time. A new systematic placement of *Archinvolvulus* Voss, 1972 is established.

## 2. Materials and methods

The weevil fossils, which the descriptions of the new genera and species are based on, originate from the largest known deposits of amber, called Baltic amber or succinate, are located along the Baltic Sea coast at the Amber quarry of Yantarny near Kaliningrad in the Kaliningrad Oblast, Russia. The amber from this deposit was probably produced by the *Sciadopitys* sp., a conifer tree of the family Sciadopityaceae, with only one currently living species in the temperate regions of central and western Japan (Sadowski *et al.* 2016). The Baltic amber from this Prussian Formation dates from middle (Ritzkowski 1997) to upper Eocene (Aleksandrova & Zaporozhets 2008).

The holotypes of the new species are stored in the Institute of Systematics and Ecology of Animals, the Siberian Branch of the Russian Academy of Sciences (Novosibirsk, Russia). Comparative material is deposited in the Institute of Systematics and Ecology of Animals, Museum für Tierkunde, Senckenberg Naturhistorischen Sammlungen Dresden (Germany), the Zoological Institute of the Russian Academy of Sciences and the Zoological Museum, University of Copenhagen (Copenhagen, Denmark).

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

The systematics of studied taxa are from Bouchard *et al.* (2011) and Legalov (2018b). The terminology of weevil body is according to Lawrence *et al.* (2010).

## 3. Description of *Baltocyba* gen. n. and *B. electrinus* sp. n.

Brentidae Billberg, 1820

Apioninae Schoenherr, 1823

Rhadinocybini Alonso-Zarazaga, 1992

### *Baltocyba* gen. n.

Type species: *Baltocyba electrinus* sp. n., described below.

*Diagnosis.* This new genus is similar to the genus *Rhadinocyba* Faust, 1889 from New Caledonia but differs from it by the short temples, coarsely punctate pronotum and strong convexity behind the middle of the body (lateral view).

*Etymology.* The name is formed from the Latin word for “Baltic” – “balticum” and part of the generic name “cyba”.

*Remarks.* The new genus and species belong to brentids based on the long ventrites 1 and 2 and short ventrites 3–5 oriented in different planes, antennae being straight, and tibiae without uncus and without two groups of setae at apex. The femora not joining with coxae, trochanters being elongate and rostrum with deep scrobes, suggest placement in the subfamily Apioninae. The elytral stria 10 merges with stria 9 near metacoxa, mesocoxal cavities being contiguous, the greatest width of pronotum being located in the apical third, scape being slightly larger than antennomeres 2–5 combined, and elytral striae being without sharp edges show that the new genus belongs to the tribe Rhadinocybini.

### Description of *Baltocyba electrinus* sp. n.

(Fig. 1)

*Type material.* Holotype: no. BA2017/9.

*Description.* Male. Body length (without rostrum) 4.3 mm, rostrum length 1.0 mm.

Body. Black, naked, appearing silvery shiny due to the presence of cavities between specimen and internal surface of its impression.

Head. Rostrum almost straight, 1.2 times as long as pronotum, 3.3 times as long as wide at apex, 3.1 times as long as wide in middle, 2.9 times as long as wide at base, finely punctate; scrobes deep and sulciform, directed under eyes; forehead 0.7 times as narrow as rostrum base, flattened, punctate; eyes large, rounded, convex; vertex weakly flattened, finely punctate; temples 0.6 times as long as diameter of eye, strigose; antennae straight, inserted near middle of rostrum laterally; antennae reaching pronotum; antennomere 1 5.6 times as long as wide, not reaching to

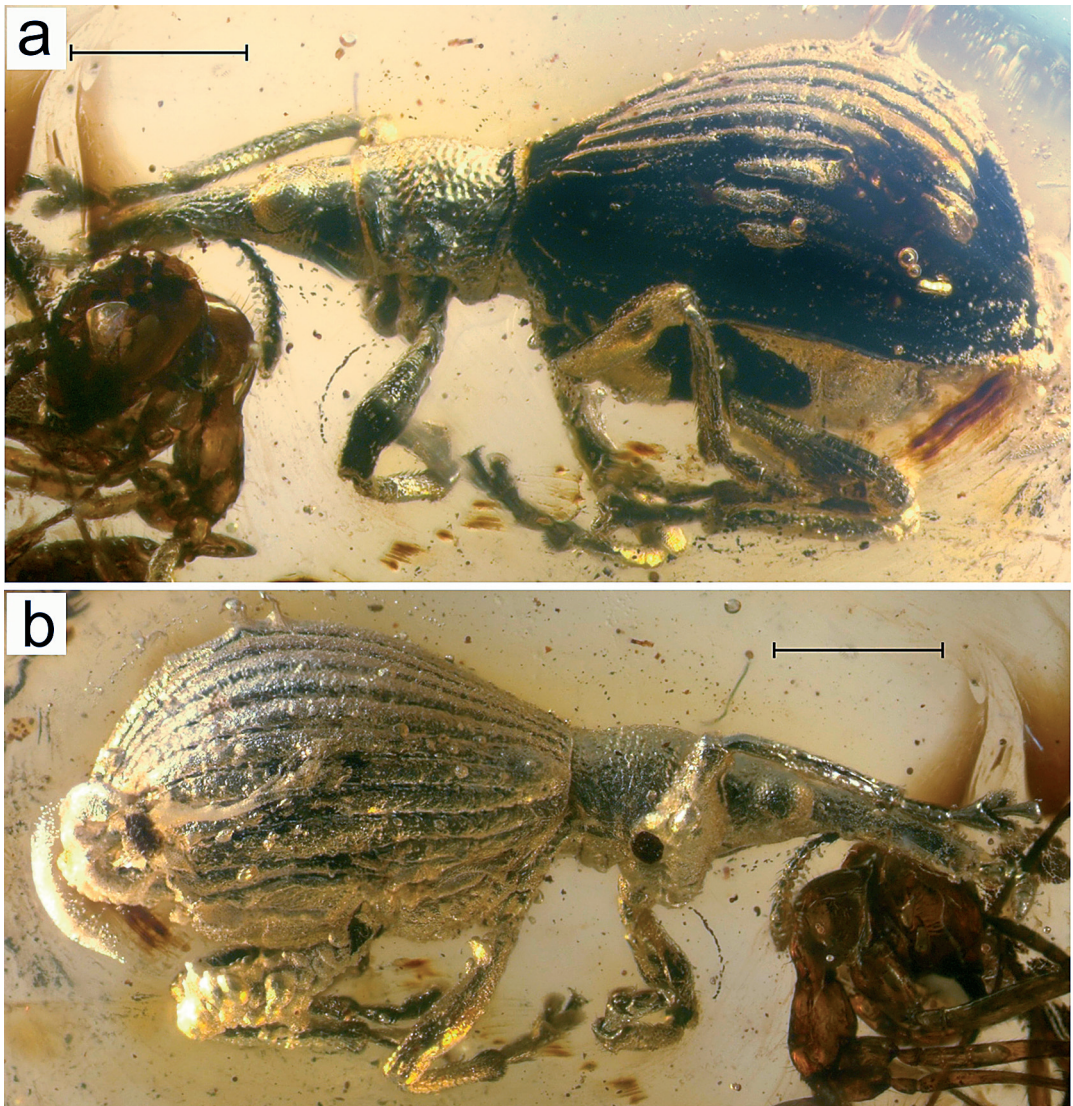


Fig. 1. Habitus of *Baltocyba electrinus* sp. n. male (holotype). – a. Lateral view, left. – b. Lateral view, right. Scale bars 1 mm.

eyes, slightly longer than antennomeres 2–5 combined; antennomeres 2–8 conical; antennomere 2 2.0 times as long as wide, 0.4 times as long and similar in width with antennomere 1; antennomere 3 2.3 times as long as wide, 0.9 times as long and 0.8 times as narrow as antennomere 2; antennomeres 3–5 subequal in width; antennomere 4 1.4 times as long as wide, 0.6 times as long as antennomere 3; antennomere 5 similar with antennomere 4; antennomere 6 1.7 times as long as wide, similar in length and 0.9 times as narrow as antennomere 5; antennomere 7 1.5 times as long

as wide, 1.2 times as long and 1.3 times as wide as antennomere 6; antennomere 8 1.1 times as long as wide, 0.9 times as long as and 1.3 times as wide as antennomere 7; club loose, 3.3 times longer than wide, 0.8 times as long as antennomeres 2–8 combined; antennomere 9 0.8 times as long as wide, 1.1 times as long and 1.6 times as wide as antennomere 8; antennomere 10 0.7 times as long as wide, 0.8 times as long and similar in width with antennomere 9; antennomere 11 1.7 times as long as wide, 2.4 times as long and 0.9 times as narrow as antennomere 10, weakly acuminate.

Diameter of eye 0.4 mm; length of antennae 1.3 mm; length of club 0.35 mm.

Pronotum. With subapical constriction, 1.1 times as long as wide at apex, 0.9 times as long as wide in middle, 1.1 times as long as wide at base; widest in middle; disk convex, coarsely punctate; pronotum widest in apical third; scutellum triangular, small. Length of pronotum 0.9 mm; width of pronotum at apex and at base 0.89 mm; width of pronotum in middle 0.97 mm.

Elytra. Pear-shaped, strongly convex behind middle (lateral view), 2.1 times as long as wide at base, 1.7 times as long as wide in middle, 2.5 times longer than wide in apical quarter, 2.5 times as long as pronotum; humeri weakly rounded; punctured striae regular and distinct, lacking sharp edges; stria 10 merging with stria 9 near metacoxa; intervals weakly convex, wide, 5.0–6.0 times as wide as striae. Length of elytra 3.19 mm; width of elytra at base 1.32 mm; width of elytra in middle 2.08 mm; width of elytra in apical quarter 1.12 mm.

Thorax. Prosternum densely punctate; precoxal part of prosternum short, 0.3 times as long as procoxa length; postcoxal part of prosternum long, 0.7 times as long as procoxa; procoxal cavities round, contiguous; metaventrite long, 2.3 times as long as metacoxa, convex, densely punctate; metepisternum 1.9 times as long as wide, punctate. Length of prosternum 0.66 mm; length of metaventrite 0.78 mm.

Legs. Procoxae conical; metacoxae transverse; trochanters conical, elongate; femora weakly clavate, not joining with coxae, without teeth; tibiae almost straight, weakly flattened, widened at apices, with apical dark setose fringe, without uncus and without two groups of setae at apex; tarsi long, with thick light erect setae dorsally; tarsomeres 1 and 2 trapezoidal; tarsomere 3 bilobed; tarsomere 4 small; tarsomere 5 elongate; claws large, free, strongly divergent; protarsi: tarsomere 1 2.8 times as long as wide; tarsomere 2 1.2 times as long as wide, 0.7 times as long and 1.7 times as wide as tarsomere 1; tarsomere 3 0.7 times as long as wide, 0.7 times as long and 1.1 times as wide as tarsomere 2; tarsomere 5 3.7 times as long as wide, 1.6 times as long and 0.3 times as wide as tarsomere 3; mesotarsi: tarsomere 1 1.5 times as long as wide; tarsomere 2 1.1 times as long as wide, 0.8 times as long and 1.1

times as wide as tarsomere 1; tarsomere 3 0.7 times as long as wide, 0.8 times as long and 1.2 times as wide as tarsomere 2; tarsomere 5 2.6 times as long as wide, 1.1 times as long and 0.3 times as wide as tarsomere 3; metatarsi: tarsomere 1 1.9 times as long as wide; tarsomere 2 similar in length and width, and 0.5 times as long as and 0.9 times as wide as tarsomere 1; tarsomere 3 0.8 times as long as wide, and 1.4 times as long and 1.7 times as wide as tarsomere 2; tarsomere 5 2.3 times as long as wide, 0.8 times as long and 0.3 times as wide as tarsomere 3. Length of profemur 1.0 mm; width of profemur 0.29 mm; length of mesofemur 1.05 mm; width of mesofemur 0.26 mm; length of metafemur 1.23 mm; width of metafemur 0.33 mm; length of protibia 1.16 mm; width of protibia 0.13 mm; length of mesotibia 0.89 mm; width of mesotibia 0.16 mm; length of metatibia 1.09 mm; width of metatibia 0.15 mm.

Abdomen. Convex; ventrites 1 and 2 and ventrites 3–5 oriented in different planes; ventrite 1 1.9 times as long as metacoxa; ventrite 2 0.9 times as long as ventrite 1; ventrites 3 and 4 subequal in length; ventrite 3 0.3 times as long as ventrite 2; ventrite 5 4.0 times as long as ventrite 4. Length of abdomen 1.6 mm.

*Type locality and type strata.* Amber deposits located along the Baltic Sea coast and Yantarny Amber quarry near Kaliningrad, Kaliningrad region, Russia, middle-upper Eocene, Prussian Formation.

*Etymology.* The name is formed from the Latin word for “amber” – “electri”.

#### 4. Description of *Baltonanophyes* gen. n. and *B. crassirostre* sp. n.

Brentidae Billberg, 1820  
Nanophyinae Gistel, 1856  
Nanophyini Gistel, 1856

##### *Baltonanophyes* gen. n.

Type species: *Baltonanophyes crassirostre* sp. n., described below.

*Diagnosis.* This new genus belongs to the group of the archaic genera: *Diplophyes* Marshall, 1933, *Indophyes* Friedman, 2012, *Lyalia* Alonso-Zarazaga et Perrin, 2011, *Meregallia*

Alonso-Zarazaga, 1990, *Oxycorax* Alonso-Zarazaga, 1990, *Shiva* Pajni et Bhateja, 1982 and *Zherikhinia* Alonso-Zarazaga, 1999, with complete elytral stria 10. From the genera *Diplophyes*, *Indophyes*, *Meregallia*, *Oxycorax*, *Shiva* and *Zherikhinia*, it is distinguished by the base of elytral interval 8 having complete crenulate carina. The new genus differs from Oriental *Lyalia* in the almost straight and thick rostrum, convex eyes, and elongate body. From Middle Eocene *Palaeonanophyes* Legalov, 2015 from Green River, the new genus differs in the almost straight and thick rostrum, strongly thickened femora and large body size.

*Etymology.* The name is formed from the Latin word for “Baltic” – “balticum” and the generic name *Nanophyes*.

*Remarks.* The new genus *Baltonanophyes* belongs to brentids based on the similar characters (excluding the antennae) as in the previous genus *Baltocyba* **gen. n.** Procoxal cavities being contiguous, femora not joining with coxae, trochanters being elongate, antennae geniculate, scrobes shallow, scutellum concealed and base of elytra having crenulate carina, suggest placement *Baltonanophyes* in the subfamily Nanophyinae. Tarsomere 5 having two fused claws and antennal club having loose segments place the new genus in the tribe Nanophyini

**Description of *Baltonanophyes crassirostre* sp. n.** (Fig. 2)

*Type material.* Holotype: no. BA2017/10.

*Description.* Male. Body length (without rostrum) 2.5 mm; rostrum length 0.9 mm.

Body. Black, covered with short decumbent hairs, appearing silvery shiny due to presence of cavities between specimen and internal surface of its impression.

Head. Rostrum almost straight and thick, 1.3 times as long as pronotum, at apex 4.7 times as long as wide, in middle and at base 5.2 times as long as wide, finely punctate; scrobes shallow, directed to eyes; forehead 0.8 times as wide as of rostrum base, flattened, punctate; eyes large, convex, 0.9 times as long as wide; vertex weakly flattened, finely punctate; temples 0.4 times as long as diameter of eye; antennae geniculate, inserted at sides of apical third of rostrum; antennae reach-

ing middle of pronotum; antennomere 1 15.0 times as long as wide, not reaching to eyes; antennomeres 2–7 conical; antennomere 2 2.5 times as long as wide, 0.2 times as long and similar in width with antennomere 1; antennomere 3 3.4 times as long as wide, 1.2 times as long and 0.9 times as narrow as antennomere 2; antennomere 4 1.4 times as long as wide, 0.4 times as long and similar in width with antennomere 3; antennomere 5 similar with antennomere 4; antennomere 6 1.3 times as long as wide, 0.9 times as long and subequal in width with antennomere 5; antennomere 7 equal in length and width, and 0.9 times as long and 1.1 times as wide as antennomere 6; club loose, 2.7 times as long as wide, 0.7 times as long as antennomeres 2–7 combined; antennomere 8 1.1 times as long as wide, 2.3 times as long as and 2.0 times as wide as antennomere 7; antennomere 9 0.9 times as long as wide, 0.9 times as long as and 1.1 times as wide as antennomere 8; antennomere 10 twice as long as wide, 2.5 times as long and 1.1 times as wide as antennomere 9, weakly acuminate. Diameter of eye 0.25 mm; length of club 0.39 mm.

Pronotum. Bell-shaped, similar in length and width at apex, 0.9 times as long as wide in middle, 0.7 times as long as wide at base; widest at base; disk convex, finely and sparsely punctate; sides almost straight; scutellum concealed. Length of pronotum 1.57 mm.

Elytra. Elongate and convex, about 1.8 times as long as wide at base, 1.5 times as long as wide in middle, 2.2 times as long as wide in apical quarter, 2.4 times as long as pronotum; base of elytra with crenulate carina; humeri weakly rounded; punctured striae regular and distinct; stria 10 complete; intervals weakly convex, wide, 5.0–6.0 times as wide as striae, with middle row of fine points; base of interval 8 with complete crenulate carina. Length of elytra 1.75 mm.

Thorax. Prosternum finely punctate; pre- and postcoxal parts of prosternum very short; procoxal cavities round, contiguous; metaventrite short, subequal in length with metacoxa, convex, finely punctate; metepisternum 5.7 times as long as wide, densely punctate. Length of prosternum 0.43 mm; length of metaventrite 0.25 mm.

Legs. Legs long; procoxae conical; metacoxae transverse; trochanters conical, elongate; femora clavate, not joining with coxae, with three



Fig. 2. Habitus of *Baltonanophyes crassirostre* sp. n. male (holotype). Lateral view, left. Scale bar 1 mm.

teeth; tibiae almost straight, weakly flattened, widened at apices, with apical dark setose fringe, without uncus and without two groups of setae at apex; tarsi long, with thick light erect setae on above surface; tarsomeres 1 and 2 trapezoidal; tarsomere 3 bilobed; tarsomere 4 small; tarsomere 5 elongate; claws large, fused at base; protarsi: tarsomere 1 1.5 times as long as wide; tarsomere 2 similar in length and width 0.8 times as long and 1.2 times as wide as tarsomere 1; tarsomere 3 0.6 times as long as wide, 0.8 times as long and 1.3 times as wide as tarsomere 2; tarsomere 4 similar in length and width; tarsomere 5 3.3 times as long as wide, 1.7 times as long and 0.3 times as wide as tarsomere 3. Length of profemur 0.99 mm; width of profemur 0.3 mm; length of mesofemur 0.84 mm; width of mesofemur 0.26 mm; length of metafemur 0.73 mm; width of metafemur 0.22 mm; length of protibia 0.71 mm; width of protibia

0.12 mm; length of mesotibia 0.6 mm; width of mesotibia 0.11 mm; length of metatibia 0.6 mm; width of metatibia 0.11 mm.

Abdomen. Convex; ventrites 1 and 2, and ventrites 3–5 oriented in different planes; ventrite 1 0.7 times as long as metacoxa; ventrite 2 subequal with ventrite 1; ventrites 3 and 4 subequal in length; ventrite 3 0.6 times as long as ventrite 2; ventrite 5 2.0 times as long as ventrite 4; pygidium convex. Length of abdomen 0.67 mm.

*Type locality and type strata.* Amber deposit located along the Baltic Sea coast and Yantarny Amber quarry near Kaliningrad, Kaliningrad region, Russia, Middle-upper Eocene, Prussian Formation.

*Etymology.* The name is formed from the Latin words for “thick” – “crassis” and “rostrum” – “rostra”.

## 5. Discussion

Weevil species representing two subfamilies, Nanophyinae and Apioninae of the family Brentidae, were found in Baltic amber. From this amber deposit also other species of the genera have been described: *Pseudaspidapion* Wanat, 1990, with one species of the tribe Aspidapiini; *Melanapion* Wagner, 1930, with tree species and *Succinapion* Legalov et Bukejs, 2015, with one species of Kalcapiini; *Electrapion* Wagner, 1924, with one species; *Conapium* Motschulsky, 1860, with one species of Piezotrachelini; and *Stenapion* Wagner, 1912, with one species of Apionini (Wagner 1924, Voss 1953, 1972, Zherikhin 1971, Legalov 2012, 2015b, Legalov & Bukejs 2015).

*Apion anderseni* Voss, 1972 and *Archinvolvulus liquidus* Voss, 1972 have also been found in the amber deposit. The systematic position of *A. anderseni* needs to be clarified, because I cannot determine the generic position of this species by the original description. *Archinvolvulus liquidus* was described in the family Attelabidae (Voss 1972) but it was subsequently correctly transferred to the subfamily Apioninae in the family Brentidae. It was placed in the tribe Rhadinocybini (Kuschel 1992), but while describing *Baltocyba electrinus* **sp. n.**, I re-examined the characters of *A. liquidus*, which I studied earlier (Legalov 2012). The genus *Archinvolvulus* Voss, 1972, **placem. n.** is characterized by the scratch-like elytral striae, the pronotum being widest near the middle and antennomere 1 almost as long as antennomeres 2 and 3 together. For these reasons, it is transferred here to the tribe Notapionini. Thus the Brentidae fauna of Baltic amber is currently represented by 11 species from nine genera (including two genera and species described here) of seven tribes.

Presently living beetles of the fossil groups in Baltic amber are encountered in Europe, North America, Oriental Region, South and East Africa, Eastern Australia and Andes meridional as shown in Alekseev's study (Alekseev 2017). The faunistic relations of Baltic amber weevils are analogical. The presently living representatives of the tribe Notapionini are distributed in Oriental Region, Eastern Australia, New Guinea, New Caledonia and other Melanesian islands (Wanat 2001). Recent genera of the tribe Rhadinocybini

live now in New Caledonia. Six archaic Nanophyini genera, recorded from Oriental Region and Zherikhinia, are known from islands of East Asia (Alonso-Zarazaga & Lyal 1999, Alonso-Zarazaga & Perrin 2011, Friedman 2012). The new data of the present study confirm the relations between fossil weevils in Baltic amber and modern species in Oriental and Australian Regions.

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