

# New genera and new species of leaf beetles (Coleoptera: Polyphaga: Chrysomelidae) from Lowermost Eocene French amber

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**Abstract.** Three new monotypical genera of leaf beetles are described: *Aoriopsis eocenicus* n. gen, n. sp. and *Acolaspoides longipes* n. gen., n. sp. from the subfamily Eumolpinae, and also *Crepidocnema yantarica* n. gen., n. sp. from the subfamily Alticinae. Short reviews of known fossil records of the mentioned subfamilies are given and position of the new genera discussed.

**Résumé. Nouveaux genres et espèces de Chrysomelidae (Coleoptera : Polyphaga) de l'ambre de l'Eocène inférieur de France.** Trois nouveaux genres monotypiques de Chrysomelidae sont décrits : les Eumolpinae *Aoriopsis eocenicus* n. gen, n. sp. et *Acolaspoides longipes* n. gen., n. sp. et l'Alticinae *Crepidocnema yantarica* n. gen., n. sp. Une revue rapide des fossiles connus attribués à ces sous-familles ainsi qu'une discussion sur la position de ces genres nouveaux sont proposés.

**Keywords:** Eumolpinae, Alticinae, new genera, new species, Lowermost Eocene amber, Oise.

This paper presents a sixth contribution to the knowledge on fauna of Coleoptera from Lowermost Eocene French amber collected in Oise falls (Batelka *et al.* 2006; Bílý & Kirejtshuk 2007; Kirejtshuk & Nel, 2008; Kirejtshuk & Nel 2009; Kirejtshuk *et al.* in press a), and is devoted to families remaining unknown from this resource and poorly known as fossils at all. The subfamilies considered in the paper are provided with a necessary short review of data on systematics and historical development. More detailed information on representation of these coleopterous families in the fossil record can be obtained from the catalogue by Ponomarenko & Kirejtshuk (2009). All new genera described here are represented by a unique species and, therefore, descriptions of them would considerably overlap with the description of species ('*descriptio generica specifica*').

## Material and methods

Many specimens recovered among inclusions from Lowermost Eocene French amber are deposited in the Laboratoire de Paléontologie, Muséum National d'Histoire Naturelle, Paris. For study of them usual optic equipment was used, in particular the stereomicroscope Olympus SCX9 and inverted microscope Olympus CK 40 in the Paris museum, and also the stereomicroscope microscope Leica MZ 16.0 in the St. Petersburg institute.

**Type strata.** Lowermost Eocene, in amber, *circa* - 53 Myr, Sparnacian, level MP7 of the mammal fauna of Dormaal.

**Type locality.** Farm Le Quesnoy, Chevière, region of Creil, Oise department (north of France).

## Order Coleoptera

### Infraorder Chrysomeloidea Latreille 1802

#### Family Chrysomelidae Latreille 1802

##### Subfamily Eumolpinae Hope 1840

This subfamily is known from fossils below the Pleistocene from Middle Eocene Geiseltal (Haupt 1950), Upper Eocene Baltic amber (Helm 1896; Klebs 1910; Hieke & Pietrzeniuk 1984; Zhang 1989), Lower Oligocene Florissant (Scudder 1892; Wickham 1911, 1912; 1914), Lower Oligocene-Dominican amber (Santiago-Blay 1994), Upper Oligocene-Miocene Bitterfeld amber (Barthel & Hetzel 1982), Oligocene-Miocene Chiapa amber (Gressitt 1963), and also from Upper Jurassic Karatau (Martynov 1926) and Lower Cretaceous Santana (Schwenninger & Schawaller 2007). However in most cases these mentions and descriptions do not include characters which can be used for diagnostics of Eumolpine genera or even clarify the subfamily and frequently family attribution. Among inclusions of the Lowermost Eocene French amber two specimens of this subfamily were recently found and each belongs to separate genera.

This subfamily can be diagnosed due to the hypognathous head not constricted on the base, antennae not closely inserted and separated by frons, tarsomere

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2 deeply bilobed and abdomen without grooves for receipt of posterior legs.

### Tribe Adoxini Baly 1865

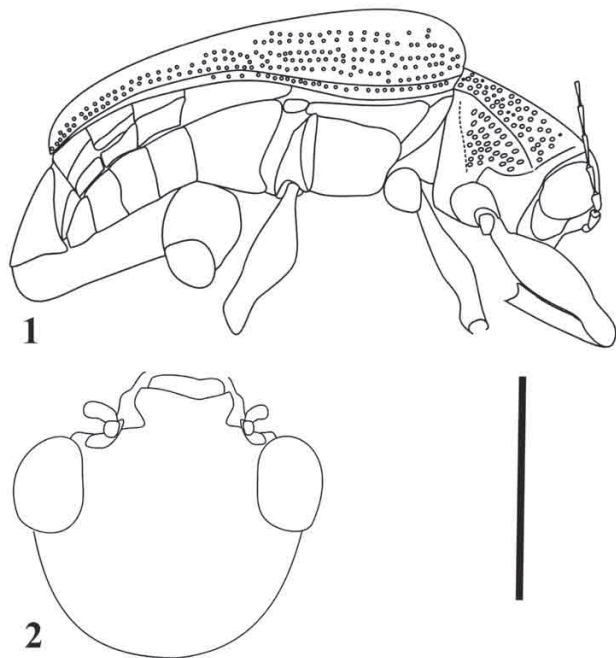
The specimen examined has clear diagnostic peculiarities of this tribe, namely: pubescent body, pronotum narrower than elytral base and pygidium without longitudinal groove.

### Genus *Aoriopsis* n. gen.

**Type species.** *Aoriopsis eocenicus* n. gen., n.sp.

**Etymology.** The name of this new genus is formed from the generic name "*Aoria*" and Greek root "*opsis*" (appearance, countenance, face); gender feminine.

**Diagnosis.** Body pubescent (but without scales). Head without paraocular grooves; antennae subfiliform and subapical antennomeres slightly dilated. Pronotum narrower than elytral base, its lateral carina very weakly expressed and becoming obsolete anteriorly and almost invisible at setiferous fossa. Pygidium without longitudinal groove. Sides of anterior edge of prosternum concave and without antennal grooves; mesoventral intercoxal process with apical excision. Femora without ventral process; tibiae without preapical excision; tarsal claws cleft. This genus should be placed into the section *Leprotites* Chapuis 1874 due to the lack of paraocular grooves on the head, subfiliform antennae, concave sides of anterior edge of prosternum, lack of antennal grooves and also due to the lack of preapical excision on tibiae and cleft tarsal claws.



**Figures 1–2**  
*Aoriopsis eocenicus* n. gen., n.sp. (Eumolpinae). 1, body, laterally; 2, head, anterally. Scale bar representing for fig. 1. 1.2 mm and for fig. 2. 0.5 mm

### *Aoriopsis eocenicus* n. sp. (Figs. 1–2, 7–9)

**Material.** Holotype PA 2437, female, almost complete beetle included in small piece of amber has been put in the glass cube with Canada balsam on microscope slide.

**Etymology.** Epitet formed from the name of geological epoch "Eocene".

**Description.** Body 3.3 mm long, 1.7 mm wide, 1.3 mm high; elongate oval; black with reddish basal antennomeres; dorsum with suberect fine and sparse hairs, on elytra arranged in longitudinal but not regular rows; underside with shorter, less conspicuous and subrecumbent hairs, however, one row of thick hairs disposed along each epipleuron.

Frons densely punctured. "Clypeus" very finely punctured. Pronotum and prohypomera densely and coarsely punctured, with interspaces between punctures much lesser than a puncture diameter. Prosternum with punctuation similar to that on pronotum and hypomera, but somewhat finer and sparser. Mesepisterna somewhat smoothed and only with a few punctures. Mesepimera and metepisterna densely punctured. Metepisterna smooth and shining. Metaventricle and abdominal ventrites with fine and sparse puncturation. Elytra with 22 longitudinal rows slightly confusing near scutellum and also with slightly expressed and very short adscutellar one, suberect hairs arranged in 11 rows alternating rows of punctures, interspaces between lateral rows looking like swollen at apices and associated with thicker hairs. Adsutural rows including 45–50 punctures. Pygidium finely punctured and at base two velvet spots with dense and short setae. Abdominal ventrite 5 with stout setae along apical edge.

Head with entire contour of eyes (without sinuation), antennal insertions disposed at the level of lower edge of eyes and with a weak frontal tubercle at inner side, equilateral frons about twice as wide as eye; "clypeus" isolated only by curved line (without clear suture); without paraocular grooves and longitudinal suture. Labrum transverse. Antennae slightly longer than half of body length and reaching metacoxae, subfiliform, scape capitate, antennomere 2 short and thick, antennomere 3 narrow and about twice as long as antennomere 2, antennomeres 3–5 about four times and antennomere 6 about three times as long as wide, antennomeres 7–11 slightly apically dilated. Pronotum about 3/4 times as wide as elytra combined, somewhat transverse (ration width to length is about 7:5) posterior edge slightly convex, with steeply sloping sides. Pygidium without longitudinal groove. Elytra with strong shoulders, making elytral sides invisible from above, somewhat narrowing apically and forming a slight sutural angle.

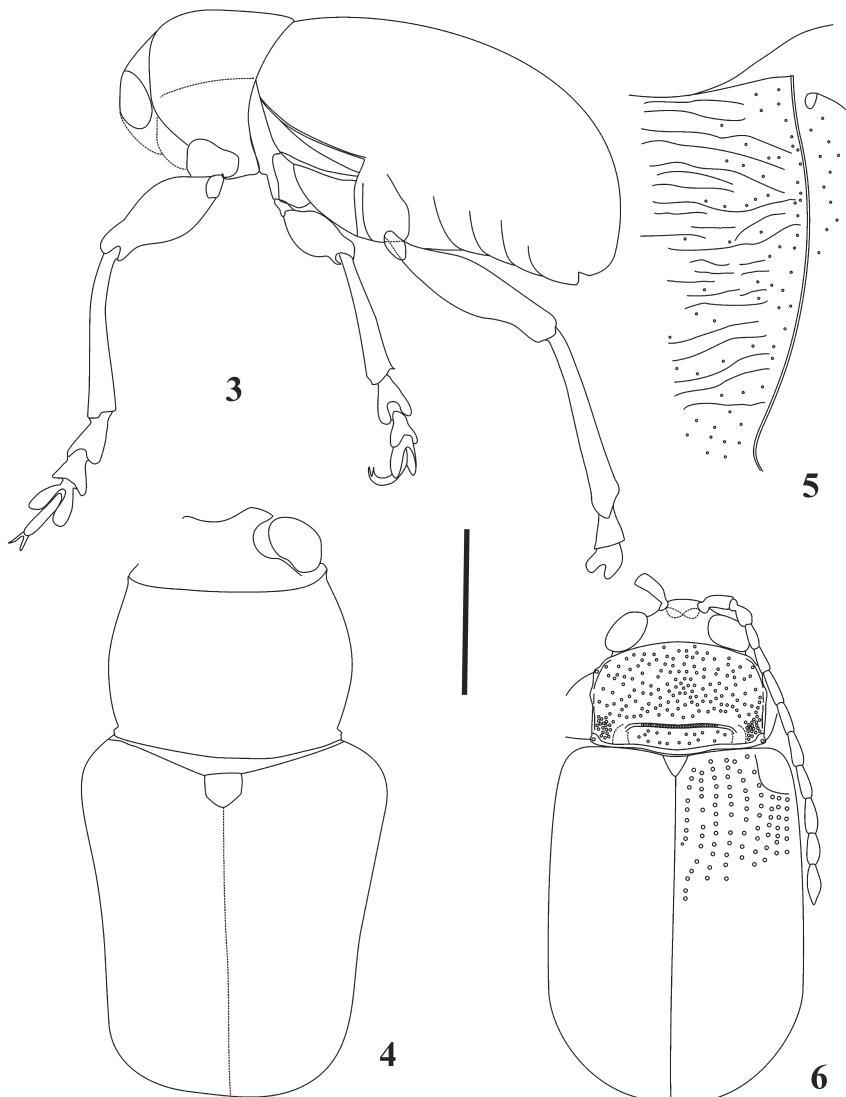
Prosternum with anterior edge slightly emarginate at sides, notosternal sutures distinct and without antennal grooves; intercoxal process as wide as procoxae; lateral parts of prosternum more swollen than prohypomera. Distance between coxae in all pairs subequal to width of coxae. Mesoventral process between mesocoxae somewhat narrower than mesocoxae and with an apical excision. Mesepisterna convex. Metaventricle about 1.5 times as long as mesocoxae. Metepisterna rather small.

Femora without clear projection; anterior and intermediate femora equally widened and posterior ones somewhat narrower. Tibiae without excision at apex somewhat thickening apically and without spur. Tarsi comparatively narrow, narrower tibial apices; tarsomere 5 about as long as tarsomeres 2 and 3 combined; tarsal claws cleft.

Ovipositor long (about as long as half of body) and with comparatively well sclerotised sclerites; paraprocti well developed; baculi of proctiger and valvifers rather wide and not stylo-shaped. Styli absent.

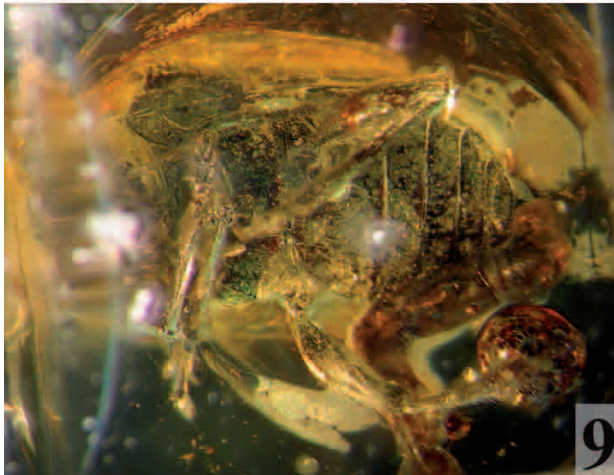
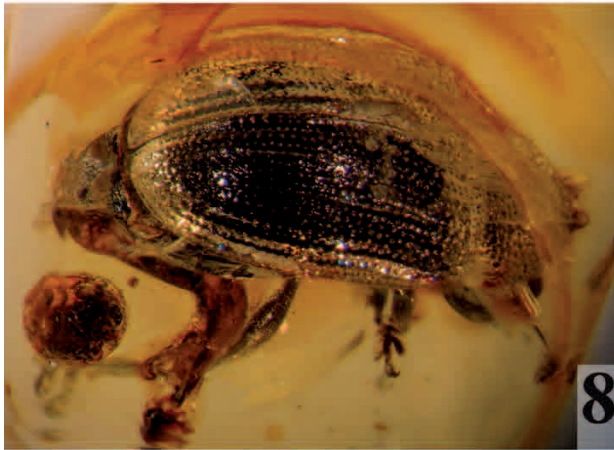
**Discussion.** The taxonomy of the subfamily Eumolpinae needs further elaboration. Reid (1993) and Gomez-Zurita *et al.* (2005) supposed that the tribe Adoxini and section *Leprotites* are not monophyletic. This tribe is traditionally divided into eight sections (Seeno & Wilcox 1982), although Reid (1993) excluded the section *Tomyrites* Chapuis 1874 and placed it into a

separate tribe Ebooini Reid 1993. Other tribes proposed during 19th century without usage the elongate groove on pygidium. The latter character was introduced for diagnostics by Chen (1935) for Chinese genera and later it was used as a diagnostic character of a considerable weight inside the tribe Eumolpinae as whole (Gomez-Zurita *et al.* 2005). According to the catalogue by Seeno & Wilcox (1982), the section *Leprotites* includes 40 genera with mainly Indo-Malayan distribution, although a part of them could be exclud-



**Figures 3–6**

*Acolaspoides longipes* n. gen., n. sp. (Eumolpinae): 3, body, laterally; 4, idem, dorsally; 5, lateral carina of prothorax, laterally. *Neocrepidodera* (*Crepidocnema*) *yantarica* n. gen., n. sp. (Alticinae): 6, body, dorsally. Scale bar representing for fig. 3. 1.3 mm, for fig. 4. 1.0 mm, for fig. 5. 0.2 mm and for fig. 6. 0.7 mm.

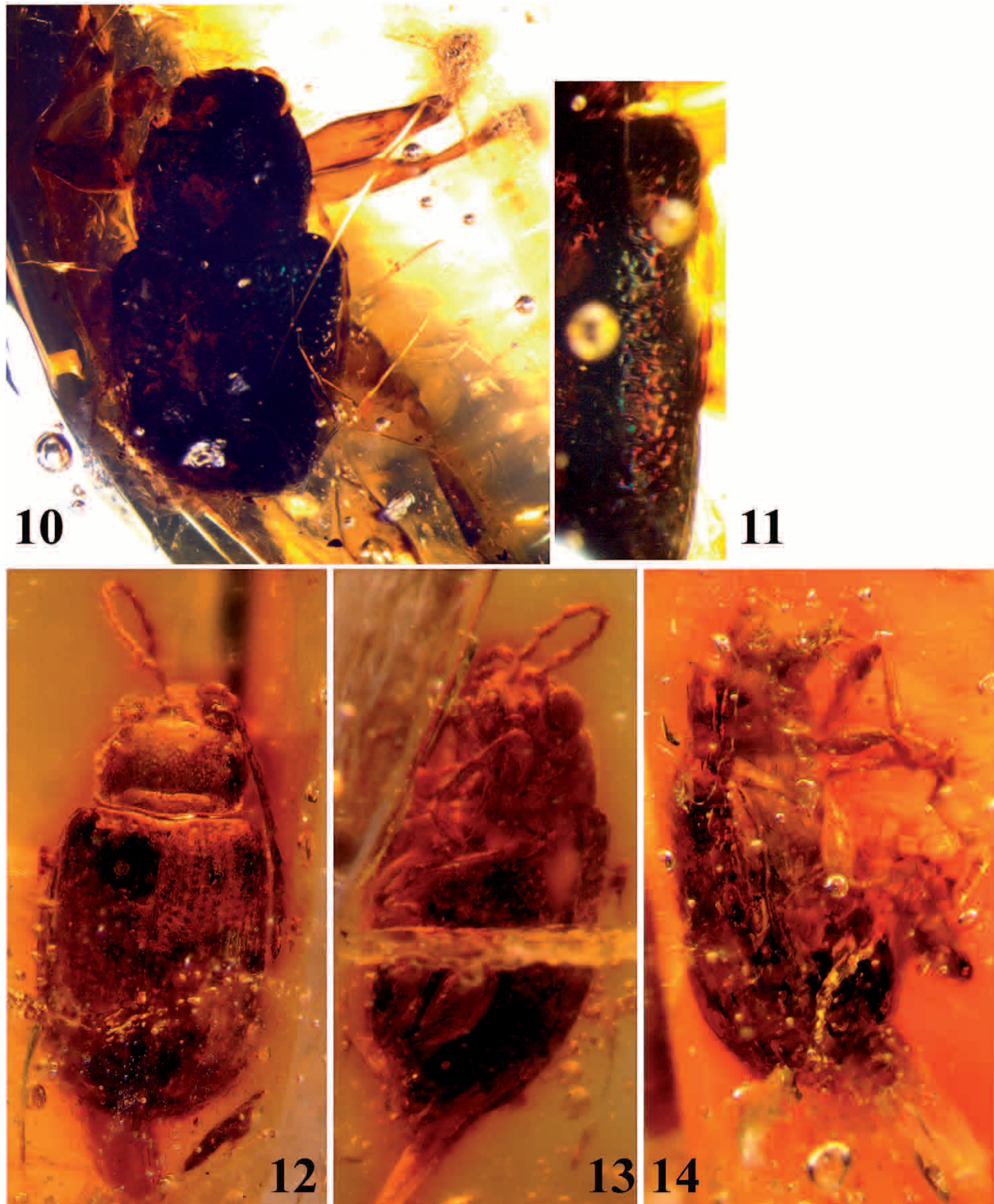


Figures 7–9  
*Aoriopsis eocenicus* n. gen., n. sp. (Eumolpinae). 7, body, lateroventrally; 8, idem, laterodorsally; 9, idem, lateroventrally.

ed from it because of the presence of this groove on pygidium. Many of these genera are characterized by scales on integument and/or narrow process of mesoventrite without apical excision.

The set of the characters listed in the above diagnosis, particularly the wide prosternal process and entire outline of eyes as well as similarity in appearance, make possible to suppose a closer relation of this new genus to *Osnaparis* Fairmaire 1889, *Aoria* Baly 1863, *Pseudaoria* Jacoby 1908, *Aloria* Bryant 1939, and also to the genus *Bromius* Chevrolat 1837 in *Dejean* 1936, traditionally regarded as a separate section (*Bromiites* Chapuis 1874), but distinguishing from *Aoria* only in the convex anterior edge of prosternum. All these genera, except *Osnaparis*, have no clear lateral carina of prothorax. The main differences between the new genus and the genus *Osnaparis* are the smaller body size, shape of the head with wide “clypeus”, comparatively short antennae with dilated subapical antennomeres, weakening of lateral carina of the prothorax and less convex posterior edge of pronotum, some regularity of row with punctures on elytra and shorter hairs on them. It should be noted that *Osnaparis nucea* Fairmaire 1889 has punctures on elytra partly arranged into irregular rows and with a row of punctures wearing hairs intermixing with a row of punctures without hairs, while some Indo-Malayan species of this genus have regular rows of punctures on elytra and short antennae scarcely reaching half of its body length. The genus *Osnaparis* is regarded by some researchers (Seeno & Wilcox 1982; etc.) as a subgenus of the genus *Aoria*, as the latter differs from the first only in the lateral carina of prothorax, and some peculiarities in structure of the head and elytral puncturation. Besides, *Aoriopsis* n. gen. is externally somewhat similar to the genus *Xanthonia*, but distinct from the latter in the wider pronotum, wider process of mesoventrite and raised lateral carina of the prothorax.

The Oligo-Miocene genus *Profidia* Gressitt 1963 from Mexican amber is the only fossil taxon which could be recognized as a member of the subfamily Eumolpinae and tribe Adoxini. It differs from *Aoriopsis* n. gen. in the narrow process of mesoventrite, projections on femora, situation in eye contour, crenulate sides of pronotum, antennal structure and some other characters. *Eoemolpinus* Haupt 1950 is the unique genus described as Eumolpinae from the Eocene, however its attribution to the leaf beetles at all is rather doubtful, because the tarsi of that specimen are badly preserved and make impossible to trace the pseudotetramerousness, besides, its femora are not narrowed at apex (as in Eumolpinae) [finally in contrast to the genus here described, *Eoemolpinus* has



**Figures 10–14**  
*Acolaspoides longipes* n. gen., n. sp. (Eumolpinae): 10, body, dorsally; 11, puncturation of elytron. *Crepidocnema yantarica* n. gen., n. sp. (Alticinae): 12, body, dorsally; 13, idem, ventrally; 14, idem, laterally.

not raised shoulders and its pronotum is more strongly narrowing anteriorly]. Even in case if *Eoemolpinus* would belong to Eumolpinae, it can be scarcely linked with Adoxini due to the presence of strictly regular row of punctures in furrows of elytra (as only in members of the tribe Nodinini Chen 1940). The Mesozoic genus *Eumolpites* Martynov 1926, non Heer 1865 was proposed as a member of Eumolpinae, however because of bad condition of this specimen it only reminds of some representatives of Eumolpinae by its general body outline and the specimen for the latter genus is much larger than one here described and pronotum of *Eumolpites* Martynov is much narrower than elytra. The same pertains to the homonymous *Eumolpites* Heer 1865. Haupt (1950) pointed out that it is scarcely possible to define a systematic position of the species described by him and, at the same time, he admitted that some species described by Heer (1865) as members of *Chrysomelites* Heer 1865 could indeed belong to Eumolpinae. Nevertheless, this admission scarcely can be taken into consideration.

### Tribe Endocephalini Chapuis 1874

The specimen examined has the following diagnostic characters of this tribe: the lack of pubescence on body sclerites, absence of clear parocular grooves, convex lateroventral parts of anterior edge of prosternum, presence of elongate groove on pygidium, tibiae without subapical excision, tarsal claws toothed at base.

### Genus *Acolaspoides* n. gen.

**Type species.** *Acolaspoides longipes* n. sp.

**Etymology.** The name of the new genus is formed of the negative prefix “a” of the generic name “*Colaspoides*”; gender masculine.

**Diagnosis.** Body short; antennae subfiliform, long and almost as long as body; prothorax with clear lateral carina, becoming obsolete at apex; pronotum coarsely sculptured; a stripe of prosternum extended onto dorsal side; elytra with well raised shoulders; femora with a small and weak tubercle along ventral side.

The genus here described should be regarded in the composition of the tribe Endocephalini, together with some genera, considered before as Eumolpini. The new genus differs from *Colaspoides* Laporte 1833 in the body shape and disposition of sutures and setiferous fossae at anterior angles of pronotum, and it differs from *Massiea* Lefèvre 1893 in the body shape, particularly shape of pronotum and structure of head. Besides, the new genus has the unique coarse sculpture of pronotum, unknown in the mentioned genera. The sculpture of pronotum in the new genus is somewhat similar to that in *Scelodonta* Westwood 1837 from

Adoxini, however the other characters of the new genus show its attribution to the tribe Endocephalini. The peculiarities of this new genus (particularly, narrow pronotum, irregularity of longitudinal rows of punctures, convexity of lateroventral edge of prosternum, etc.) do not allow to compare this genus with any extinct genus of the subfamily Eumolpinae.

### *Acolaspoides longipes* n. sp. (Figs. 3–5, 10–11)

**Material.** Holotype PA 2364, sex unknown, almost complete beetle included in small piece of amber is put in the cylindrical glass frame with Canada balsam on microscope slide and covered by the round cover glass.

**Etymology.** Epitet formed from the Latin “*longus*” (long) and “*pes*” (foot).

**Description.** Body 3.6 mm long, 1.8 mm wide, 1.7 mm high; elongate oval; body and elytra greenish and with metallic shine, antennae and legs reddish; integument without visible pubescence. Frons and “clypeus” finely punctured. Pronotum coarsely sculptured, with irregular punctures and transrugosity. Elytra with irregular longitudinal rows of punctures. Prosternum and prohypomera smoothed. Mes- and metepimera smoothed and with sparse punctures. Metaventrite punctured. Pygidium apparently with longitudinal groove. Head without parocular grooves, but with excavations along the eye contour; frons wide, about twice as wide as transverse diameter of eye; “clypeus” not separated from frons. Antennae filiform, almost as long as body. Pronotum about 0.7 times as wide as elytra, posterior edge slightly curved. Elytra with strongly raised shoulders, at base about 1.4 times as wide as in distal fourth. Pronotum with raised lateral carinae. Anterior edge convex lateroventrally, its stripe extending on dorsal side along anterior edge of pronotum; pronotosternal sutures distinct. Metaventrite about 1.5 times as long as mesocoxae. Femora with weak tubercle on ventral side. Tibiae without preapical excision. Tarsal claws toothed at base.

### Subfamily Alticinae Spinola 1844

This subfamily is known in fossils below the Pleistocene from Paleocene Menat (Piton 1940), Upper Eocene Baltic amber (Klebs 1910; Hieke & Pietrzeniuk 1984; Kubisz 2000), Lower Oligocene Kleinkembs (Théobald 1937), Lower Oligocene Florissant (Scudder 1892; Wickham 1911, 1912, 1914), Middle Eocene Geiseltal (Haupt 1956), Oligocene Brunstatt (Förster 1891), Upper Oligocene or Lower Miocene Siebengebirge (Schlechtendal 1894), Oligocene-Miocene Chiapa amber (Gressitt 1971), Lower Miocene Radoboj (Heer 1858), Lower Miocene Dominican amber (Santiago-Blay *et al.* 1996), Upper Miocene Oeningen (Heer 1847), Upper Miocene Cantal (Théobald 1937; Piton 1939).

This subfamily can be diagnosed due to the hypognathous head not constricted on the base; antennae closely inserted and almost not separated by frons,

abdomen without grooves for receipt of posterior legs and widened posterior femora, adopted for jumping. The tribal partition of this subfamily represents a great complexity and most recent authors (Seeno & Wilcox 1982; Konstantinov & Vandenberg 1996 etc.) prefer not to divide it into them.

### Genus *Crepidocnema* n. gen.

**Type species.** *Crepidocnema yantarica* n. sp.

**Etymology.** The name of this new genus is formed from the Latin roots of other Crysmelid genera (“*crepido*” and “*cnema*”); gender feminine.

**Diagnosis.** Body small and oval, subunicolorous reddish, without pubescence. Frontal tubercles small, transverse and isolated from frons by a narrow groove. Antennae 11-segmented. Pronotum narrower than elytra, its base widely bordered and with transverse basal groove restricted by paralateral short indistinct depressions, at bottom of the groove a row of dense punctures is located. Each elytron with five complete regular simple (not double) rows of punctures and one short row of punctures. Posterior tibiae with simple spurs. Ultimate tarsomere not widened.

The new genus corresponds to the characteristics of *Neocrepidodera* Heikertinger 1911 (Konstantinov & Vandenberg 1996), however the specimen under consideration has the bordered pronotal base, distinct transverse groove with dense row of punctures on pronotum, widely arcuate elytral apices. In contrast to species of *Crepidodera* Chevrolat in Dejean 1836, the frontal tubercles of *Crepidocnema yantarica* are not separated from the frons by a deep groove and its body has reddish coloration. According to the taxonomic interpretation of Chapuis (1875) this genus belongs to the tribe Crepidoderini Chapuis 1875 because of the presence of transverse groove at the pronotal base with elongate depressions at each side, regular puncturation of elytra, 11-segmented antennae, metatarsi joined with tibial apices, simple spur of metatibiae.

### *Crepidocnema yantarica* n. sp. (Figs. 6, 12–14)

**Material.** Holotype PA 2802, probable female, almost complete beetle included in flat piece of amber (5.0, 10.0 and 1.1 mm) is glued to two quadrangular cover glasses. This piece of amber has a crack dividing the beetle transversely into 2 parts.

**Etymology.** Epithet of this new species is formed from the Russian “янтарь” (amber).

**Description.** Body 2.3 mm long, 1.2 mm wide, 0.7 mm high; elongate oval; almost completely reddish, only abdomen somewhat darker. Pronotum with dense punctures, becoming denser at posterior angles. Prohypomera smoothed and without puncturation. Elytra with five regular longitudinal rows of punctures and short prescutellar row, but without secondary puncturation. Head with small transverse tubercles separated from frons by a narrow groove. Eyes with entire outline, without

sinuation. Distance between eyes about as an eye diameter. Antennae 11-segmented, filiform and with somewhat widened five subapical antennomeres, apical antennomere pointed at apex. Lateral carina of prothorax well expressed. Pronotum with wide basal border and basal transverse groove (about 2/3 as great as pronotal width) and basal paralateral depressions at sides of this groove; the groove rather deep and with a row of very dense punctures; depressions wide and shallow, without furrow. Elytra widely rounded at apices, with strong shoulders, which, however, make possible to see lateral carina from above. Epipleura well developed; elytral base about 1.2 times wide as pronotum and maximum width of elytra at apical 1/3 about 1.4 times as great as width of pronotum. Anterior edge of prosternum with three projections, the middle one with a setiferous fossa. Procoxae closed posteriorly. Femora jumping, about twice as long as wide, without projections. Tibiae without subapical excision, with simple spur, metatarsi joining at tibial apices. Tarsi usual, tarsomeres 1–3 subequal in width; claws toothed at base.

**Note.** The specimen examined seems to be a female because protarsomeres comparable in width with meso- and metatarsomeres.

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### References

- Barthel M., Hetzer H. 1982. Bernstein-Inklusen aus dem Miozän des Bitterfelder Raumes. *Zeitschrift für Angewandte Geologie* 28: 314–336.
- Batelka J., Collomb F.-M., Nel, A. 2006. *Macrosiagon deuwei* n. sp. (Coleoptera: Ripiphoridae) from the French Eocene amber. *Annales de la Société Entomologique de France* (N.S.) 42: 75–78.
- Bilý S., Kirejtshuk A. G. 2007. *Philanthaxoides gallicus* gen. n., sp. n. from the Lowermost Eocene French amber (Coleoptera: Buprestidae). *Folia Heyrovskyana* A 14: 181–186.
- Chapuis F. 1874. *Histoire naturelle des Insectes. Genera des Coléoptères ou exposé méthodique et critique de tous les genres proposés jusqu’ici dans cet ordre d’insectes.* Par M.M. Lacordaire et F. Chapuis. Tome dixième. Famille des Phytophages. Paris, LV + 455 p.
- Chapuis F. 1875. *Histoire naturelle des Insectes. Genera des Coléoptères ou exposé méthodique et critique de tous les genres proposés jusqu’ici dans cet ordre d’insectes.* Par M.M. Lacordaire et F. Chapuis. Tome onzième. Famille des Phytophages. Paris, 220 p.
- Chen S. 1935. Study of Chinese Eumolpid beetles. *Sinensia* 3 (6): 221–387.
- Förster D.B. 1891. Die Insekten des „Plattigen Steinmergels“ von Brunstatt. *Abhandlungen zur Geologischen Spezialkarte von Elsass-Lothringen*, Strasbourg 2: 334–593.
- Gomez-Zurita J., Jolivet P., Vogler A.P. 2005. Molecular systematics of Eumolpinae and the relationships with Spilopyrinae (Coleoptera, Chrysomelidae). *Molecular Phylogenetic and evolution* 34: 584–600.
- Gressitt L. J. 1963. A fossil chrysomelid beetle from the amber of Chiapas, Mexico. *Journal of Paleontology* 37: 108–109.

- Gressitt L. J. 1971.** A second fossil chrysomelid beetle from the amber of Chiapas, Mexico. *University of California Publications in Entomology* **63**: 63-64.
- Haupt H. 1950.** Die Käfer (Coleoptera) der Eozanen Braunkohle des Geiseltales. *Geologica*, Berlin **6**: 1-168.
- Haupt H. 1956.** Beitrag zur Kenntnis der eozänen Arthropodenfauna des Geiseltales. *Nova Acta Leopoldina* (N.F.) **18**: 1-90.
- Helm O. 1896.** Beiträge zur Kenntnis der Insekten des Bernsteins. *Schriften der Naturforschenden Gesellschaft Danzig* (N.F.) **9**: 220-231.
- Heer O. 1847.** Die Insektenfauna der Tertiärgebilde von Eningen und von Radoboj in Croatien. Erste Abtheilung: Käfer. Leipzig, W. Englemann (ed.). *Neue Denkschriften Allgemeinen Schweizerischen Gesellschaft für die Gesamten Naturwissenschaften*, Zurich **9**: 222 pp.
- Heer O. 1858.** Über die Insectenfauna von Radoboj. *Amtlicher Bericht der Versammlung Deutscher Naturforscher und Ärzte* **32**: 118-126.
- Hieke F., Pietrzeniuk E. 1984.** Die Bernstein-Käfer des Museums für Naturkunde, Berlin (Insecta: Coleoptera). *Mitteilungen der Zoologische Museum Berlin* **60**: 297-326.
- Kirejtshuk A. G., Nel A. 2008.** Some new fossils of the suborder Polyphaga (Coleoptera (Insecta)) from Lowermost Eocene French amber. *Annales de la Société entomologique de France* (N.S.) **44**: 419-442.
- Kirejtshuk A. G., Nel A. 2009.** New genera and species of Cucujiformia (Coleoptera, Polyphaga) from lowermost Eocene French amber. *Denisia* **26**: 103-118.
- Kirejtshuk A. G., Nel A., Collomb F.-M. 2009.** New Archostemata (Insecta, Coleoptera) from the French Paleocene and Early Eocene, with a note on the composition of the suborder. *Annales de la Société entomologique de France* (N.S.) **45**: 000-000.
- Klebs R. 1910.** Über Bernsteineinschlüsse in allgemeinen und die Coleopteren meiner Bernsteinsammlung. *Schriften der Physikalischen-Ökonomische Gesellschaft zu Königsberg* **51**: 217-242.
- Konstantinov A. S., Vandenberg N. J. 1996.** *Handbook of Palaearctic flea beetles (Coleoptera, Chrysomelidae, Alticinae)*. Associated Publisher Gainesville, Florida, USA, 439 p.
- Kubisz D. 2000.** Fossil beetles (Coleoptera) from Baltic amber in the collection of the Museum of Natural History of ISEA in Krakow. *Polish Journal of Entomology* **69**: 225-230.
- Martynov A. 1926.** К познанию ископаемых насекомых юрских сланцев Туркестана. 5. О некоторых формах жуков (Coleoptera). [To the knowledge of fossil insects from Jurassic beds in Turkestan. 5. On some interesting Coleoptera.] *Ezhgodnik Russkogo Paleontologicheskogo Obschestva* **5**: 1-38. [in Russian].
- Piton L. 1939.** Note complémentaire sur les insectes fossiles des cinérites pliocènes du Lac Chambon (Puy-de-Dôme). *Revue des Sciences Naturelles d'Auvergne* (N.S.) **5**: 102-108.
- Piton L. 1940.** Paléontologie du gisement éocène de Menat (Puy-de-Dôme), flore et faune. *Mémoire de la Société d'Histoire Naturelle d'Auvergne* Clermont-Ferrand **1**: 1-303.
- Ponomarenko A. G., Kirejtshuk A. G. 2009.** *Taxonomic list of fossil beetles of suborder Scarabaeina (Part 3)*. <http://www.zin.ru/Animalia/Coleoptera/eng/paleosys2.htm> (April 2009).
- Reid C. A. M. 1993.** Eboo, nom. n. redescription of type species (Coleoptera: Chrysomelidae: Eumolpinae). *The Coleopterists Bulletin* **47**: 61-67.
- Santiago-Blay J. A. 1994.** Paleontology of leaf beetles, p. 1-68 in: **Jolivet P. H., Cox M. L., Petit-Pierre G. (eds).** *Novel aspects of the biology of Chrysomelidae*. Kluwer Academic Publishers, Dordrecht, Boston, London, 582 p.
- Santiago-Blay J. A., Poinar G. O. Jr., Craig P. R. 1996.** Dominican and Mexican amber chrysomelids, with description of two new species, p. 413-424 in: **Jolivet P. H. A., Cox M. L. (eds).** *Chrysomelidae biology. Volume 1. The classification, phylogeny and genetics*. SPB Academic Publishing, Amsterdam.
- Seeno N. T., Wilcox J. T. 1982.** Leaf beetle genera. *Entomography* **1**: 1-221.
- Schlechtendal D. H. R. von. 1894.** Beiträge zur Kenntnis fossiler Insekten aus dem Braunkohlengeburge von Rott am Siebengebirge. *Abhandlungen der Naturforschenden Gesellschaft Halle* **20**: 197-228.
- Schwenninger K., Schwallier W. 2007.** Coleoptera: beetles, p. 338-350 in: **Martill D. M., Bechly G., Loveridge R. F. (eds).** *The Crato Fossils Beds of Brasil: window into an ancient world*. Cambridge University Press, Cambridge-N.Y.-Melbourne-Cape Town-Singapore-São Paulo.
- Scudder S. H. 1892.** Some insects of special interest from Florissant, Colorado and other points of the Tertiaries of Colorado and Utah. *Bulletin of the United States Geological Survey* **93**: 1-25.
- Théobald N. 1937.** Les insectes fossiles des terrains oligocènes de France. *Bulletin Mensuel (Mémoires) de la Société des Sciences de Nancy* **1**: 1-473.
- Wickham H. F. 1911.** Fossil Coleoptera from Florissant, with description of several new species. *Bulletin of the American Museum of Natural History* **30**: 53-69.
- Wickham H. F. 1912.** A report on some recent collections of fossil Coleoptera from the Miocene shales of Florissant. *Bulletin from the Laboratories of Natural History of the State University of Iowa* **6**: 3-38.
- Wickham H. F. 1914.** New Miocene Coleoptera from Florissant. *Bulletin of the Museum of Comparative Zoology*, Harvard **58**: 423-494: 423-494.
- Zhang J.-F. 1989.** [Fossil insects from Shanwang, Shandong, China.] Shandong Science and Technology Publishing House, Jinan: 459 p. [in Chinese with abstract in English].