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NEW SPECIES OF THE GENUS *TRIXAGUS* KUGELANN, 1794 (COLEOPTERA: THROSCIDAE) FROM THE LOWERMOST EOCENE AMBER OF OISE (FRANCE)

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ABSTRACT

Trixagus majusculus sp. nov., the third fossil representative of the genus of the elaterioid family Throscidae: Throscinae is described from the Lowermost Eocene amber of Oise (France). The new species is compared with both extinct and extant species of the genus. “*Throscus* (?)” *peritulus* Cockerell, 1925 is excluded from the family Throscidae and a review of the available fossil representatives of this family is given.

Key words: amber, Coleoptera, Insecta, France, Lowermost Eocene, new species, Throscidae, *Trixagus*

НОВЫЙ ВИД РОДА *TRIXAGUS* KUGELANN, 1794 (COLEOPTERA: THROSCIDAE) ИЗ НИЖНЕЭОЦЕНОВОГО ЯНТАРЯ УАЗЕ (ФРАНЦИЯ)

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РЕЗЮМЕ

Из нижнеэоценового янтаря Уазе (Франция) описан *Trixagus majusculus* sp. nov., третий представитель рода элатероидного семейства Throscidae: Throscinae. Новый вид сравнивается как с вымершими, так и современными видами. “*Throscus* (?)” *peritulus* Cockerell, 1925 выведен из состава семейства Throscidae и дан обзор имеющихся ископаемых представителей этого семейства.

Key words: янтарь, Coleoptera, Insecta, Франция, нижний эоцен, новый вид, Throscidae, *Trixagus*

INTRODUCTION

The family Throscidae Laporte, 1840 represents a comparably not numerous group in both recent and previous faunas. The most fossils of this family

remain undescribed. Nevertheless, they are known from the Miocene Dominican amber, Eocene Baltic, Bitterfeld and Fushun amber, Upper Cretaceous Sakhalin amber, Lower Cretaceous Lebanese and Burmese amber, and also from compression deposits of Khetana River (Lower Cretaceous), London Clay (Upper Paleocene-Lower Eocene), Messel (Middle

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Eocene), Florissant (Uppermost Eocene-Lowermost Oligocene), and Amagu River (Miocene). There are not so many descriptions published which make possible to discuss the phylogeny. These are *Palaeothroscus sosnovski* Iablokoff-Khnzorian, 1962 and *Troscites tschitscherini* Iablokoff-Khnzorian, 1962 from Baltic amber, although later the first was transferred by Cobos (1963) to genus *Trixagus* Kugelann, 1794 and second to *Aulonothroscus* Horn, 1890; *Trixagus peritulus* Cockerell, 1925 from Amagu River; *Megoccephalites eocenicus* Hong, 2001 from Fushun amber; *Pactopus americanus* Wickham, 1914 from Florissant (Colorado, USA); *P. avitus* Britton, 1960 from London Clay (United Kingdom); and the rest from Baltic amber: *P. fasolti* Muona, 1993 and *P. fafneri* Muona, 1993; *Jaira bella* Muona, 1993; *Potergus frochi* Muona, 1993 and *P. logei* Muona, 1993. Most mentions on fossil Throscidae are supplied only by indication of family or at most genus summarized in the catalogue by Ponomarenko and Kirejtshuk (2011).

This paper presents the eighth contribution to the knowledge on fauna of Coleoptera from the Lowermost Eocene French amber collected in Oise falls of Paris Basin (Batelka et al. 2006; Bilý and Kirejtshuk 2007; Kirejtshuk and Nel 2008, 2009; Kirejtshuk et al. 2010a, 2010b, 2010c; Moseyko et al. 2010).

Note. *Throscus* (?) *peritulus* Cockerell, 1925, which according to the current taxonomic interpretation should be considered with the generic name *Trixagus*, was described after the print of beetle dorsum from the outcrop in Terneysky District (Primorsky Krai, Russian Far East) from Khutsynskaya Formation. This specimen is deposited in the Smithsonian National Museum of Natural History in Washington. The pronotum as figured the picture in the original paper shows scarcely projecting posterior angles and, therefore, the specimen certainly cannot belong to the family Throscidae and its attribution to any other elateroid family is also rather questionable.

MATERIAL AND METHODS

The holotype of the species under consideration as many specimens recovered among inclusions from the Lowermost Eocene French amber is deposited in the Laboratoire de Paléontologie, Muséum National d'Histoire Naturelle, Paris. Usual optic equipment was used for their study, 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 Zoological Institute RAS (Saint Petersburg).

Type strata. Lowermost Eocene, in amber, *circa* – 53 Myr, Sparnacian, level MP7 of the mammal fauna of Dormaal (Nel et al. 1999).

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

SYSTEMATICS

Family Throscidae Laporte de Castelnau, 1840

Subfamily Throscinae Laporte de Castelnau, 1840

Genus *Trixagus* Kugelann, 1794

Type species: *Dermestes adstrictor* Herbst, 1794 (= *Elater dermestoides* Linnaeus, 1767).

***Trixagus majusculus* sp. nov.**

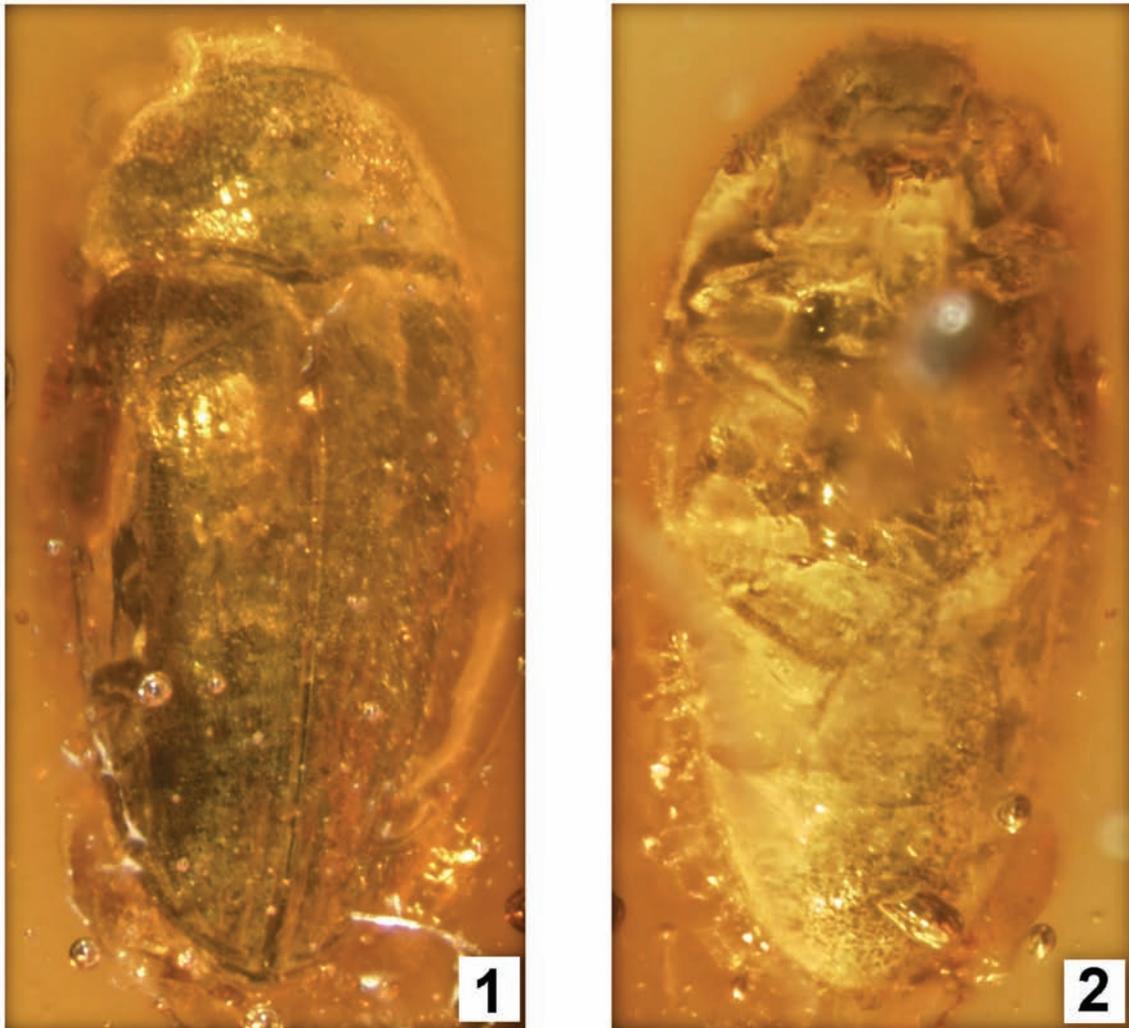
(Figs 1–4)

Holotype. MNHN.FA46040 (PA 1673), probable female, completely preserved, but the entire underside is covered with thinner or thicker milky cover intermixed with short hairs and hardly visible; also with vertical crevices along left and right lateral sides of dorsum. The holotype is included in a large irregular amber piece (length 27, width 20, height 5 mm), not completely polished; at both sides of the beetle there are located four specimens of Brachycera and many gas bubbles of different size and many pieces of white and dark organic matter of different size (gas bubbles and pieces of organic matter irregularly spread through the amber piece examined).

Etymology. The epithet of the new species means 'rather large', referred to the body size of the new species which is largest among the congeners.

Diagnosis. The new species differs from *Palaeothroscus sosnovskyi* Iablokoff-Khnzorian, 1962 described from Baltic amber (transferred by Cobos (1963) to *Trixagus*) in the subparallel lateral borders of the prosternal plate, distinctly bisinuate base of pronotum and larger body size, which is wider and more tapered posteriorly, and apparently in the finer and sparser dorsal puncturation.

Also the new species differs from all recent species of *Trixagus* in the larger body and the combination of the following features: deeply incised eyes, weakly convex frons without carinae and large, almost flat prosternal plate and very coarse and sparse punctura-

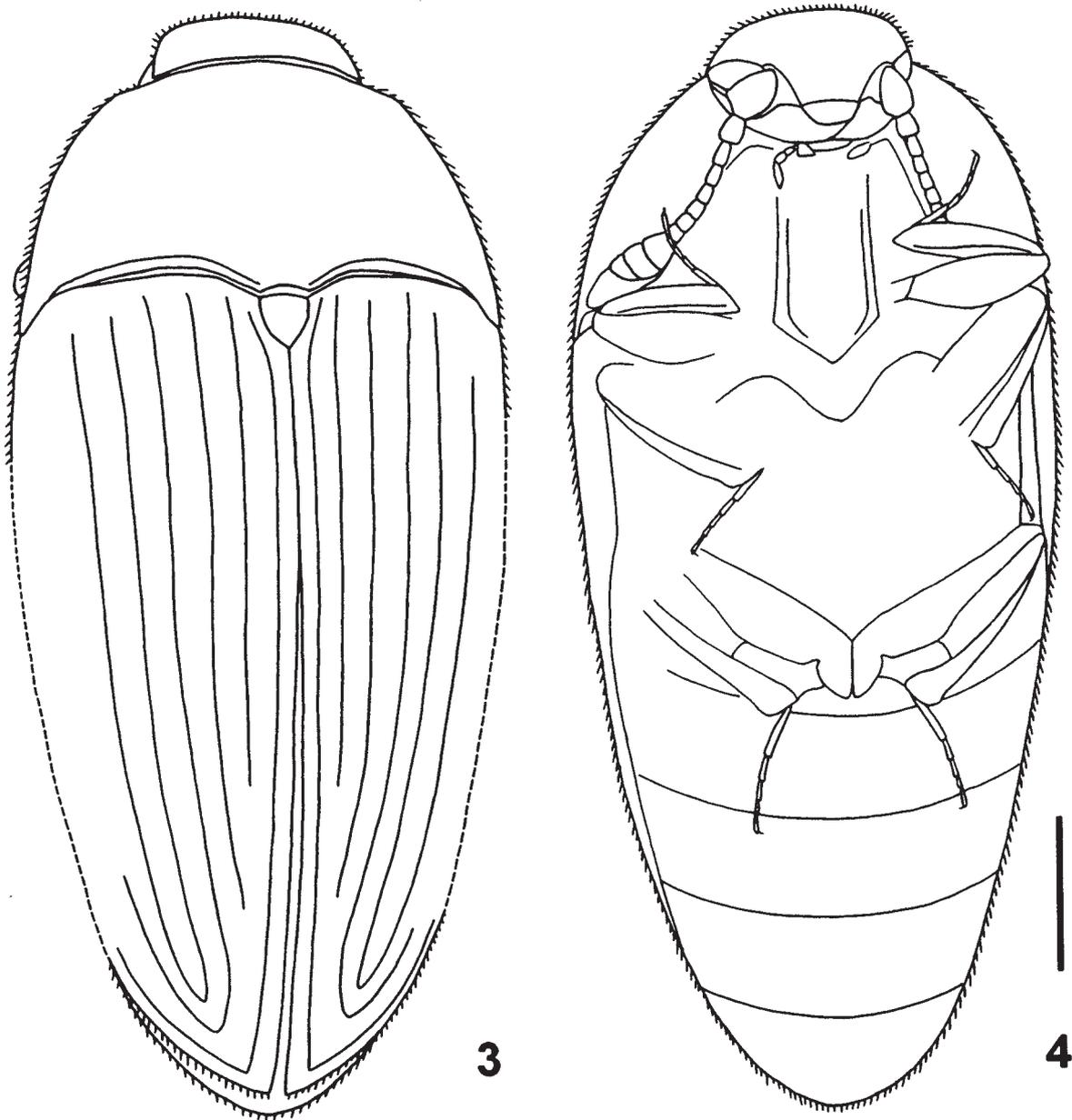


Figs. 1–2. *Trixagus majusculus* sp. nov. (Coleoptera, Throscidae), holotype: 1 – body, dorsal; 2 – idem, ventral. Length – 3.55 mm.

tion of elytra. At the same time the new species have as large body as some recent members of the *Aulonothroscus* which are also characterized by more or less incised eyes and well expressed grooves on metaventrite to receive the mesotarsi. At the current study the new species should be put in the genus *Trixagus* because it does not demonstrate trace of tarsal grooves on metaventrite. The combination of incised eyes and convex frons without elongate keels is rather characteristic of *Trixagus* but not *Aulonothroscus*, although some members of the latter have not these keels (for instance Afrotropical *A. subtilis* Cobos, 1960; *A. allu-*

audi Cobos; 1962 and *A. stanleyi* Cobos, 1962 as well as Australian *A. adonis* Cobos, 1963).

The new species is similar to the recent Western Palearctic *T. dermestoides* (Linnaeus, 1767) in the relatively wide and almost flat prosternal plate, moderately short and dense pubescence, not masking the sculpture of integument, wide frons and larger body, but differs from the latter in the excision of anterior edge of eyes expanded the middle of eye diameter, larger body and lack of frontal carinae. Also this new species can be compared with the Palearctic members of species-group related to *T. carinifrons* Bonvou-



Figs. 3–4. *Trixagus majusculus* sp. nov. (Coleoptera, Throscidae), holotype: 3 – body, dorsal; 4 – idem, ventral. Scale bar – 0.5 mm.

loir, 1859, which are similar to the new species in the larger body, character of pubescence and deeply excised eyes, but *T. majusculus* sp. nov. differs from them in the wide frons without any traces of frontal carinae, smaller eyes, wider and almost flat median prosternal plate and larger body. Besides, the new species can be compared with *T. gautheri* Cobos, 1972 from Algeria with the comparatively robust, moderately convex

and large body, deeply excised eyes and lack of frontal keels, but differs from the latter in the almost flat and parallel-sided prosternal plate, markedly larger body and apparently in the sparser dorsal pubescence.

Description. Length 3.55, width 1.55 mm. Body elongate-oval, more narrowing posteriorly, about 2.3 times as long as wide, moderately convex both dorsally and ventrally; dark brown to blackish, dorsum

with a weak shine. Dorsum withy subuniform, moderately long, moderately dense, moderately conspicuous and suberect hairs 4–5 times as long as distance between their insertions; underside with somewhat finer, shorter and sparser hairs.

Head with puncturation formed by moderately coarse and sparse punctures and interspaces between them with extremely fine and dense punctures. Pronotum with double puncturation, formed by coarse and sparse punctures interspersed extremely fine and dense punctures. Elytra with nine fine and shallow striae at bottom of which there are located rows of fine and shallow, sparse punctures; intervals between them almost flat, with moderately coarse and very sparse punctures, somewhat finer than on the pronotum, and interspaces between them with extremely fine and dense punctures.

Head comparatively large; frons rather convex and without any trace of frontal carinae, slightly wider than its height. Eye medium-sized, slightly convex, excision of their anterior edge as extended as somewhat more than three-quarters of eye diameter. Labrum transverse, about twice as wide as long, trapezoidal, with widely rounded lateral angles. Antennae relatively short and thin; antennomere 1 large, slightly longer than its wide; antennomere 2 large, almost as wide as previous and about as long as wide; antennomeres 3–8 small (antennomeres 3–5 elongate, antennomeres 6–8 almost quadrate; 3-segmented club relatively small, elongate-oval; antennomere 9 arcuately widening to emarginated apex, antennomere 10 nearly transversely quadrangular, antennomere 11 strongly transverse and rounded at apex.

Pronotum wide and short, 1.85 times as wide as long along the middle, evenly arcuately widening to posterior angles. Base of pronotum bisinuate; basal impressions nearly indistinct; median part of posterior edge short projecting, nearly straight at apex. Posterior angles far projecting and much longer than projecting median part of posterior edge. Lateral carinae long, reaching anterior third of pronotum. Scutellum subpentagonal with widely rounded sides and subacute apex, slightly wider than long. Elytra elongate, widest behind base, about 1.75 times as long as wide combined (at anterior fourth), gradually narrowing to apices which are forming a conjoining arc.

Prosternal plate and process flat, moderately short and wide, subparallel-sided; with lateral borders; subangular at the apex. Metaventrite of usual structure,

relatively convex. Metacoxal plates of usual shape. Abdomen with shallow indistinct depressions for receipt of metatarsi on ventrites 1–3. Anal ventrite rounded at apex.

Legs of same structure (as in recent congeners).

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REFERENCES

- Barthel M. and Hetzer H. 1982.** Bernstein-Inklusen aus dem Miozän des Bitterfelder Raumes. *Zeitschrift für Angewandte Geologie*, **28**: 314–336.
- Batelka J., Collomb F.-M. and Nel A. 2006.** *Macrosiagon dewei* n. sp. (Coleoptera: Ripiphoridae) from the French Eocene amber. *Annales de la Société Entomologique de France*, (N.S.), **42**(1): 75–78.
- Bílý S. and Kirejtshuk A.G. 2007.** *Philanthaxoides gallicus* gen. nov., sp. nov. from the Lowermost Eocene French amber (Coleoptera: Buprestidae). *Folia Heyrovskyana*, **14**(4): 181–186.
- Cobos A. 1963.** Comentarios criticos sobre algunos Sternoxia fósiles del ámbar del Báltico recientemente descrito (Coleoptera). *Eos, Revista Española de Entomología*, **39**(3–4): 345–355.
- Cockerell T.D.A. 1925.** Tertiary insects from Kudia River, Maritime Province, Siberia. *Proceedings of the United States National Museum*, **66**(19): 1–13.
- Iablokoff-Khnzorian S.M. 1962.** Predstaviteli Sternoxia iz Baltijskogo Yantarya. Semeystvo Throscidae Bach, 1849 (*Trixagidae* sensu Crowson) [Representatives of Sternoxia (Coleoptera) from the Baltic amber. Family Throscidae Bach, 1849 (*Trixagidae* sensu Crowson)]. *Paleontologicheskij Zhurnal*, **3**: 81–89. [In Russian]
- Kirejtshuk A.G. and 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**(4): 419–442.
- Kirejtshuk A.G. and 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. and Collomb F.-M. 2010a.** 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.), **46**(1): 216–227.
- Kirejtshuk A.G., Nabozhenko M.V. and Nel A. 2010b.** New genus and species of the tribe Opatrini (Coleoptera, Tenebrionidae, Tenebrioninae) from the lowermost Eocene amber of Paris Basin. *Proceedings of the Zoological Institute RAS*, **314**(2): 191–196.
- Kirejtshuk A.G., Hava J. and Nel A. 2010c.** New genus and species of subfamily Trinodinae (Coleoptera, Polyphaga, Dermestidae) from Lowermost Eocene French amber. *Zoosystematica Rossica*, **19**(1): 54–69.
- Moseyko A.G., Kirejtshuk A.G. and Nel A. 2010.** New genera and new species of leaf beetles (Coleoptera, Polyphaga, Chrysomelidae) from Lowermost Eocene French amber. *Annales de la Société Entomologique de France*, (N.S.), **46**(1): 116–123.
- Muona J. 1993.** Eucnemidae and Throscidae from Baltic amber (Coleoptera). *Entomologische Blätter*, **89**: 15–45.
- Nel A., Ploég G. de, Dejax J., Duthiel D., Franceschi D. de, Gheerbrant E., Godinot M., Hervet S., Menier J.-J., Augé M., Bignot G., Cavagnetto C., Dufaud S., Gaudant J., Hua S., Jossang A., Lapparent de Broin F. de, Pozzi J.-P., Paicheler J.-C., Bouchet F. and Rage J.-C. 1999.** Un gisement sparnacien exceptionnel à plantes, arthropodes et vertébrés (Éocène basal, MP7): Le Quesnoy (Oise, France). *Comptes rendus de l'Académie des sciences, Sciences de la Terre et des planètes*, **329**: 65–72.
- Ponomarenko A.G. and Kirejtshuk A.G. 2011.** Taxonomic list of fossil beetles of suborder Scarabaeina (Part 3). <http://www.zin.ru/Animalia/Coleoptera/rus/paleosys2.htm> <http://www.zin.ru/Animalia/Coleoptera/eng/paleosys2.htm> (September 2011).
- Wedmann S. 1994.** Fossile Vertreter der Eucnemidae und Throscidae (Insecta: Coleoptera) aus der mitteleozänen Messel-Formation. *Courier Forschungsinstitut Senckenberg*, **170**: 65–73.

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