Russian Entomol. J. 15(3): 327–333

First fossil record of Cedusini in the Eocene Baltic amber with notes on the tribe (Hemiptera: Fulgoromorpha: Derbidae)

Первая ископаемая находка Cedusini в эоценовом балтийском янтаре с замечаниями о трибе (Hemiptera: Fulgoromorpha: Derbidae)

Jacek Szwedo
Я. Шведо

Department of Systematics and Zoogeography, Museum and Institute of Zoology, Polish Academy of Sciences, Wilcza 64, PL 00-679 Warszawa, Poland. E-mail: szwedo@miiz.waw.pl

Отделение систематики и зоогеографии, Музей и институт зоологии ПАН, Вильча 64, PL 00-679 Варшава, Польша.

KEY WORDS: Hemiptera, Derbidae, Cedusini, taxonomy, new genera, new species, new combinations, Eocene, Baltic amber, fossil insects.

КЛЮЧЕВЫЕ СЛОВА: Hemiptera, Derbidae, Cedusini, таксономия, новые роды, новый вид, новые комбинации, эоцен, балтийский янтарь, ископаемые насекомые.

ABSTRACT. New extinct genus and species — *Emeljanovedusa gentarna* **gen.n.** et **sp.n.**, of the planthopper family Derbidae, tribe Cedusini, from the middle Eocene Baltic amber is described. New extant genera of Cedusini are established: *Hauptenia* **gen.n.**, *Muiredusa* **gen.n.**, *Produsa* **gen.n.** New combinations are given: *Hauptenia magnifica* (Yang & Wu, 1993), **comb.n.**; *H. jacula* (Yang & Wu, 1993), **comb.n.**; *H. fellea* (Yang & Wu, 1993), **comb.n.**, *H. glutinosa* (Yang & Wu, 1993), **comb.n.**, *H. idonea* (Yang & Wu, 1993), **comb.n.**, *Muiredusa brunnea* (Muir, 1914), **comb.n.**, *M. littorea* (Yeh & Yang, 1993), **comb.n.**, *M. ignota* (Yeh & Wu, 1993), **comb.n.**, *Produsa concava* (Yang & Wu, 1993), **comb.n.**, and *P. cubica* (Yang & Wu, 1993), **comb.n.** Key to genera placed in Cedusini is given and placement of the fossil genus and its relationships within the tribe are discussed.

РЕЗЮМЕ. Новый ископаемый род и вид цикадовых семейства Derbidae, трибы Cedusini — *Emeljanovedusa gentarna* **gen.n.** et **sp.n.** описан из среднего эоцена балтийского янтаря. Установлены новые роды для современных Cedusini: *Hauptenia* **gen.n.**, *Muiredusa* **gen.n.**, *Produsa* **gen.n.** Предложены новые комбинации: *Hauptenia magnifica* (Yang & Wu, 1993), **comb.n.**; *H. jacula* (Yang & Wu, 1993), **comb.n.**; *H. fellea* (Yang & Wu, 1993), **comb.n.**, *H. glutinosa* (Yang & Wu, 1993), **comb.n.**, *H. idonea* (Yang et Wu, 1993), **comb.n.**, *Muiredusa brunnea* (Muir, 1914), **comb.n.**, *M. littorea* (Yeh & Yang, 1993), **comb.n.**, *M. ignota* (Yeh & Wu, 1993), **comb.n.**, *Produsa concava* (Yang & Wu, 1993), **comb.n.** и *P. cubica* (Yang & Wu, 1993), **comb.n.** Дана определительная таблица родов, помещённых в трибу Cedusini, и обсуждены положение и родственные отношения ископаемого рода в пределах трибы.

Introduction

The planthopper family Derbidae houses a large number of species. It is one of the largest and most morphologically differentiated family among Fulgoroidea. Fennah [1952] and Emeljanov [1995] elaborated classification and evolution of Derbidae, but the distribution of some characters still remains controversial and the available data are not sufficient to substantiate the phylogeny of the group. Numerous taxonomic problems within the group remain, and Derbidae, as well as their subunits, are sometimes believed to be paraphyletic [Emeljanov & Fletcher, 2004]. The higher classification of extant Derbidae has recently been presented by Emeljanov [1995], who presented a more detailed system based on external morphological characters. He divided Derbidae into three subfamilies and 18 tribes. The subfamily Cedusinae comprises the tribes Ipsnolini, Goneokarellini, Vinatini, Cedusini, Phrygiini, and recently [Emeljanov & Fletcher, 2004] the tribe Breddiniolini Fennah, 1950, formerly placed in Achilidae [Fennah, 1950; Emeljanov, 1991, 1992b] but lately transferred here. Subfamily Derbinae comprise the tribes Cedochreini, Dawnarioidini, Derbini, Cenchreini and Nicertini, while subfamily Otiocerinae include the tribes: Kamendakini, Rhotanini, Otiocerini, Patarini, Neocyclocarini, Phenicini, Zoriaidini, Sikaianini and recently described [Banaszkiewicz & Szwedo, 2005] tribe Aquaeliciini. According to Emeljanov [1995], the taxa placed in the tribe Mysidiini, proposed by Broomfield [1985], are to be placed within Derbini.

The Eocene Baltic amber inclusions of Derbidae comprise only *Positrona shcherbakovi* Emeljanov, 1994, of the tribe Otiocerini [Emeljanov, 1994] and *Lugeilan-*

gor elektrokleistis Szwedo, 2005 [Szwedo, 2005] of the tribe Otiocerini are known. Unnamed representatives of the tribe Cedusini mentioned by Szwedo [2002] are described below. From Oligocene/Miocene resins of the New World more taxa are described. Derbidae inclusions described from Dominican amber are: *Cedusa credula* Emeljanov & Shcherbakov, 2000, of the tribe Cedusini and *Dysimia imprudens* Emeljanov & Shcherbakov, 2000 of the tribe Derbini [Emeljanov & Shcherbakov, 2000]. Inclusions recorded in Mexican amber are: *Cedusa baylissae* Szwedo & Ross, 2003 of the tribe Cedusini [Szwedo & Ross, 2003] and *Copallinges chiapasensis* Szwedo, 2004 of the tribe Cenchreini [Szwedo, 2004]. A few other unnamed Derbidae are known from Oligocene/Miocene Dominican amber — specimens figured in Poinar & Poinar [1999] and Eocene Bitterfeld amber [Szwedo, 2002]. *Mysidioides migdisovae* Emeljanov, 2002, of the tribe Otiocerini has been described by Emeljanov [2002] from Miocene strata of Stavropol' (Northern Caucasus Mts.) The record of Derbidae from Upper Triassic strata of Brazil [Pinto, 1956] is based on misinterpreted material [Emeljanov, 1994; Szwedo, 2002; Szwedo et al., 2004]. This fossil known as *Sanctipaulus mendesi* Pinto, 1956, has been transferred to Trichoptera, undetermined family, by Martins-Neto et al. [2003].

Taxonomy

The tribe Cedusini could be characterized as follows: head and tegmina without sensory pits, apical segment of rostrum distinctly longer than wide, female with abdominal sternite VII not fused with abdominal tergite VIII. The last feature is of particular interest as, fusion of the sternite VII with tergite VIII is believed to be synapomorphy for all Derbidae, with exception of Cedusini and Derbini [Emeljanov 1992a]. According to Emeljanov [1995] the tribe Cedusini comprises three genera: *Cedusa* Fowler, 1904, *Melusa* Emeljanov, 1995, and *Eocenchrea* Muir, 1913. The taxonomic status of the genus *Malenia* Haupt, 1929 (synonym of *Cedusa* or distinct genus) remained controversial for a long time. Fennah [1961] discriminated those two genera on the basis of venation features. Yang & Wu [1993] separated Taiwanese species ascribed to genera *Cedusa* and *Malenia* on the basis of hind leg femorotarsal formula and structure of the male genital block. All African species of *Cedusa* have been referred to *Malenia* by Fennah [1961], and such action was followed by Synave [1973], Van Stalle [1984] and Wilson [1987]. All American species are assigned to the genus *Cedusa* by Flynn & Kramer [1983] and Kramer [1986]. According to their opinion "the morphological differences between *Cedusa* and *Malenia* are slight but convenient in light of the zoogeographical considerations". It seems that the only feature which could differ American species from the others is, that styles of American species are slightly asymmetrical, with the inner margin very variable: produced, lobed, incised or notched, or entire and sometimes convex, concave, or subparallel to the outer ventral margin, [Flynn & Kramer, 1983; Kramer, 1983]. One species, *Cedusa wolcotti* Muir, 1924 seems not to be congeneric with the other American species ascribed to *Cedusa*, as it is the only member of the genus with the posterior prolongation of the pygofer and is very unique possessing a ventral plate [Caldwell & Martorell, 1951, Flynn & Kramer, 1983]. It seems that the genus *Cedusa* is a paraphyletic unit, and needs to be revised, as well as other taxa placed in Cedusini.

The following key could be used for delimitation of genus-level taxa ascribed to Cedusini.

1. Tegmen with joined claval veins Pcu+A_1 reaching commissural margin of tegmen, reaching vein A_2. Tegmen with branches of stem of the vein M forming anterior comb 2
–. Tegmen with joined claval veins Pcu+A_1 reaching claval suture, reaching vein CuP, near apex of clavus. Tegmen with branches of stem of the vein M forming posterior comb 7
2. Wing with vein $ScRA_1$ very short, reaching anterior margin near wing coupling apparatus 3
–. Wing with vein $ScRA_1$ long, reaching anterior margin near its apex ..... *Emeljanovedusa* **gen.n.**
3. Transversely oblique carina across the gena distinct from the subantennal process, as long as basal width of the process. Antennal pedicel about as long as wide, slightly flattened. Genital styles asymmetrical, New World species ..... *Cedusa* Fowler
type species: *Cedusa funesta* Fowler, 1904: 103; by subsequent designation by Muir 1913: 35.
–. Genital styles symmetrical, Old world species 4
4. Transversely oblique carina across the gena between the subantennal process and lateral carina of frons not longer than half of the basal width of the process, confluent with the process as a broad flange. Tegmen with veins Sc+R fork basad of claval veins junction, fork of vein CuA at level claval veins junction. Antennal pedicel about twice as long as wide. African and Palaearctic species .... *Malenia* Haupt
type species: *Lamenia bosnica* Horváth, 1907: 322; by original designation by Haupt 1929: 194.
–. Transversely oblique carina across the gena between subantennal process and lateral carina of frons indistinct. Anal tube not distinctly elongated, about twice as long as wide, usually with apex not reaching level of apex of genital styles. Oriental species 5
5. Genital styles slender, dorsobasal projection basad. Hind leg tibiotarsal spinal formula 6 : 5 : 5 6
–. Genital styles short and stout, dorsobasal projection distad. Hind leg tibiotarsal spinal formula 7 : 6 : 5. Anal style of male turned ventrad or nearly so, slightly notched at apex in lateral view. Female with sternite VII rather small ..... *Hauptenia* **gen.n.**
6. Pygofer with dorsocaudal angle produced into finger-shaped process. Wings with vein CuA with two terminals. Anal style of male not turned ventrad, not forked at apex. Female with sternite VII rather large ..... *Produsa* **gen.n.**
–. Pygofer with dorsocaudal angle not produced caudad. Wings with vein CuA with three terminals. Anal style of male with apical portion turned ventrad or nearly so, forked at apex in dorsal view ..... *Muiredusa* **gen.n.**
7. Membranes of tegmina not extending posteriad beyond apex of clavus, not overlapping in resting position. Tegmen with apices of terminals of veins on membrane slightly bent

anteriad. Tegmen about 2.5 times as long as wide. Vertex not much broader than long. Hind leg tibiotarsal spinal formula 5 : 6 : 5 ..... *Melusa* Emeljanov
type species: *Eocenchrea dardanus* Fennah, 1958: 499; by original designation by Emeljanov 1995: 793.

–. Membranes of tegmina extending posteriad of apex of clavus, overlapping in resting position. Tegmen with apices of terminalia on membrane straight. Tegmen about 3.5 times as long as wide. Vertex about twice as wide as long. Carina across the gena between the subantennal process and lateral carina of frons slightly oblique from the horizontal, prominent, reaching lateral carinae of frons; posterior margin of gena ridged and extending to the lower posterior angle of the compound eye, developed as a knob or concave lobe forming part of the dorsal edge of the postantennal fovea. Hind tibia with lateral spine, hind tibiotarsal formula 5 : 5(6) : 5(6) ..... *Eocenchrea* Muir
type species: *Cenchrea maorica* Kirkaldy, 1909: 80; by original designation by Muir 1913: 36.

Order Hemiptera Linnaeus, 1758

Suborder Fulgoromorpha Evans, 1946

Superfamily Fulgoroidea Latreille, 1810

Family Derbidae Spinola, 1839

Subfamily Cedusinae Emeljanov, 1992

Tribe Cedusini Emeljanov, 1992

Emeljanovedusa Szwedo, **gen.n.**

Type species: *Emeljanovedusa gentarna* Szwedo, **sp.n.**

DESCRIPTION. The habitus very similar to other representatives of the tribe, females slightly bigger than males. Head with vertex widely trapezoid, about 2/3 as wide at anterior margin between lateral carinae of frons as wide at posterior margin, lateral margins of frons distinctly produced anteriad in dorsal view. Frons without median carina, concave with lateral margins distinctly elevated; frons distinctly wider in lower portion at level of antennae than at upper margin, delimited from vertex by straight carina. Postclypeus about as long as frons, 3-carinate. Apical segment of rostrum longer than wide. Ocelli present. Subantennal process well developed; carina across the gena between the subantennal process and lateral carina of frons slightly oblique from the horizontal. Antennal pedicel round, about as long as wide. Pronotum narrow, lateral carinae and ventral margins not subfoliately raised to form cup-like antennal fovea, ventral margin slightly elevated. Mesonotum with slightly elevated median carina. Tegmina with subcostal cell long, vein RA with two terminals, vein RP with two terminals, vein M with 5 terminals, forked slightly apicad of half of tegmen length, vein CuA forked at level of claval veins junction, clavus with apex slightly exceeding half of tegmen length. Wing with vein $ScRA_1$ long, subparallel to vein RP, reaching anterior margin of wing near its apex, vein M single, vein CuA with three terminals. Hindleg without lateral spine, tibiometatarsal spinal formula 6 : 5 : 5.

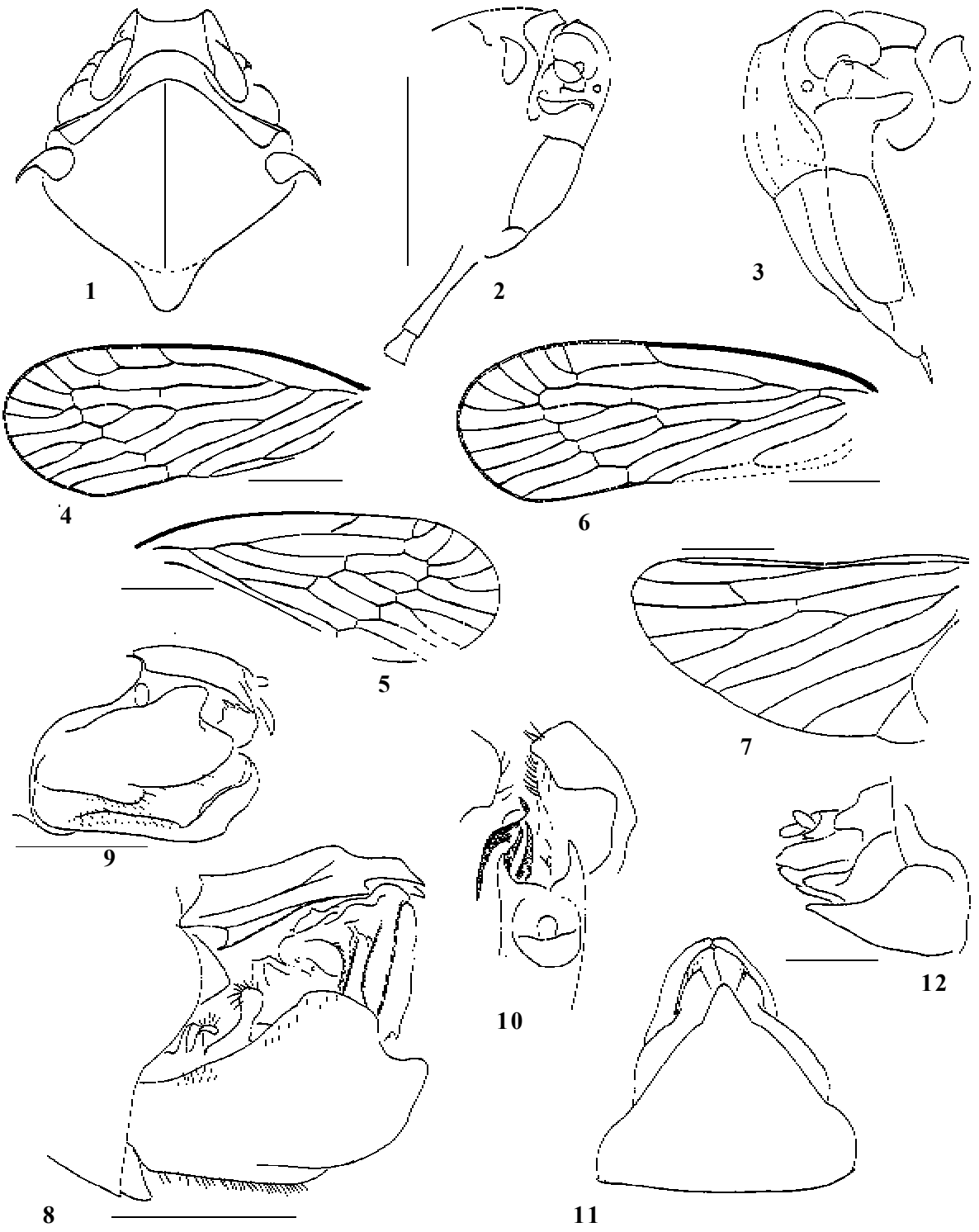
DIAGNOSIS. Differs from *Cedusa*, by long branch of $ScRA_1$ of the hind wing reaching distinctly more apicad (branch extremely short, reaching anterior margin of hind wing near coupling apparatus in *Cedusa*); width of anterior margin of vertex about 2/3 of width of posterior margin of vertex (anterior and posterior margins of vertex of similar width in *Cedusa*); frons distinctly wider at level of antennae than at upper margin (frons with margins subparallel in *Cedusa*).

ETYMOLOGY. Named in honour of Professor Alexandr F. Emeljanov, an eminent entomologist, specialist on the Hemiptera, combined with "*Cedusa*" — genus of Derbidae. Gender: feminine.

Emeljanovedusa gentarna Szwedo, **sp.n.**
Figs 1–16.

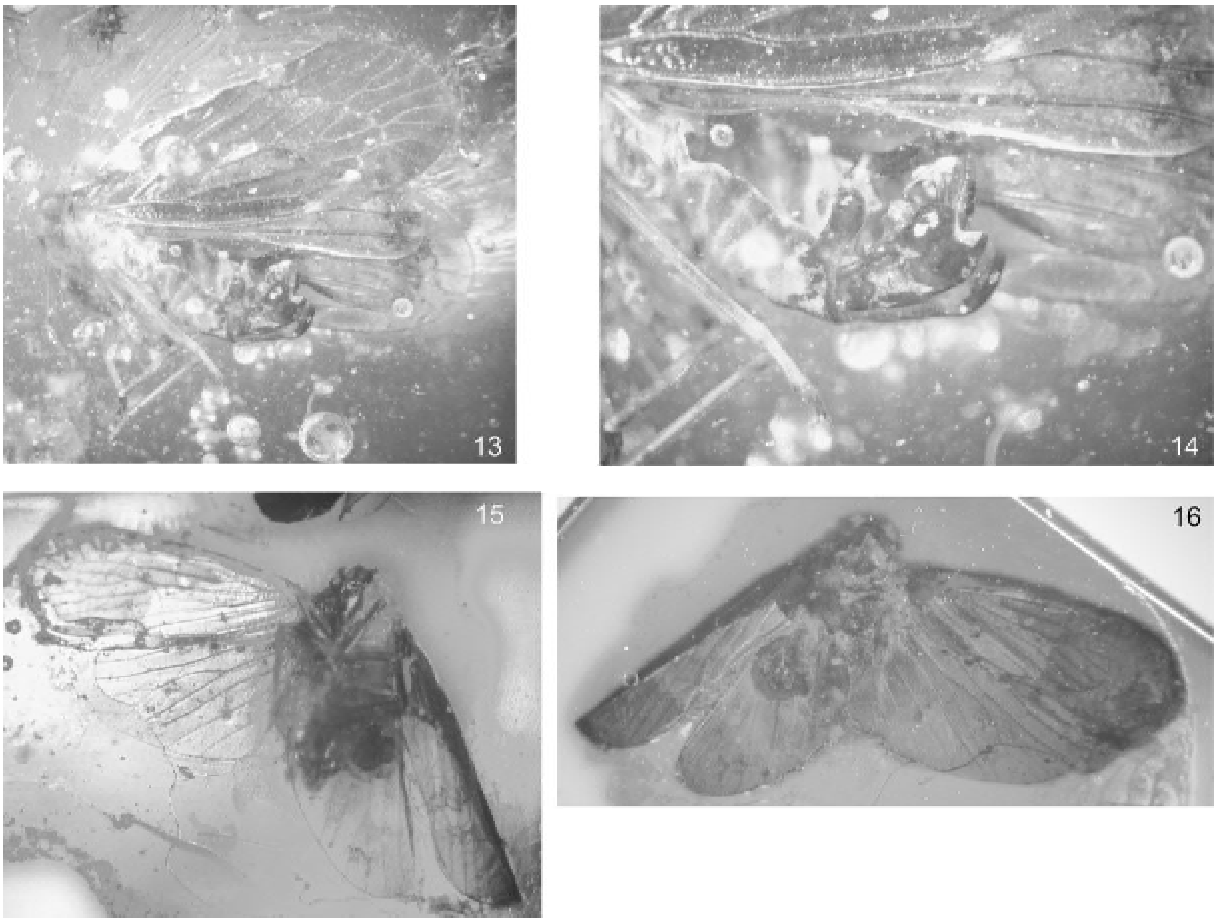
MATERIAL: Holotype, ♂: Eocene Baltic amber inclusion, coll. Jacek Serafin, AUF056JS, deposited in the Natural History Museum, Institute of Systematics and Evolution of Animals, Polish Academy of Sciences, Kraków [ISEZ]. labelled: red label [Holotype] [*Emeljanovedusa gentarna* Szwedo, 2006 / ♂]. Paratypes: ♂, ZMUC Hem002/BaltA, labelled: [Auchenorrhyncha / C.V. Henningsen / 9 — 3 / 1967], red label [Paratype] [*Emeljanovedusa gentarna* Szwedo, 2006 / ♂], Natural History Museum of Copenhagen, Zoological Museum, Copenhagen, specimen partly destroyed, anterior part of the body, tegmina and wings partly damaged, piece of amber darkened, cube shaped; ♀: ZMUC Hem003/BaltA, labelled: [Auchenorrhyncha / C.V. Henningsen / 1 — 1 / 1966], red label [Paratype] [*Emeljanovedusa gentarna* Szwedo, 2006 / ♀], Natural History Museum of Copenhagen, Zoological Museum, Copenhagen, specimen with tegmina and wings partly spread, in rectangular, plate like, polished, dark red piece of amber.

DESCRIPTION. Total length 4.25 mm (male), 5.0 mm (female), length of body 2.9 mm (male), 3.3 mm female. Length of tegmen 3.7 mm (male), 4.25 mm (female). Head with compound eyes narrower than pronotum. Vertex in mid line about half as long as wide between carinae of frons, one third as long as wide at posterior margin. Anterior margin distinctly incised, lateral margins slightly elevated, posterior margin shallowly concave. Frons at widest point about 1.5 times as wide as wide at upper margin. Lateral margins of frons distinctly elevated, carinate. Clypeus in mid line about as long as frons in mid line, median and lateral carinae distinct. Rostrum with subapical segment about four times as long as apical; apical segment about 1.3 times as long as wide. Head with subantennal processes slightly narrower than pronotum. Antafossae elevated, antennal pedicel globose. Lateral ocelli distinct. Pronotum short in mid line, with indistinct median carina; lateral carinae distinct. Mesonotum about as long in mid line as wide, convex, with elevated median carina. Tegula about twice as wide as long. Tegmen with anterior margin slightly curved, apical margin widely round. Clavus closed, with apex slightly exceeding half of tegmen length. Basal cell elongate, veins Sc+R+M leaving basal cell with short common stalk; forking Sc+R and M distinctly basad of CuA forking and claval veins junction; Vein $ScRA_1$ reaching anterior margin of tegmen at level of apex of clavus, vein RA with two terminals; Vein RP forking basad of CuA forking and claval veins junction, two terminals reaching apical margin of tegmen; Vein M forking distinctly apicad of CuA forking and claval veins junction, about at level of nodal line, 5 terminals reaching apical margin of tegmen; Vein CuA forked at level of claval veins junction, with two terminals; Claval veins Pcu and A_1 joined at half of clavus length. Transverse veinlets *ir*, *r-m* and *m-cu* present, apical line of transverse veinlets present; veinlet *icu* reaching posterior margin of membrane present. Wings with vein $ScRA_1$ long, in apicad portion subparallel to vein RP, reaching anterior margin of wing near apex; Vein M single, vein CuA with three terminals; veins CuP and Pcu single; vein A_1 forked; transverse veinlet *r-m* oblique, transverse veinlet *m-cu* straight, perpendicular to longitudinal veins; anal lobe wide, without



Figs 1–12. *Emeljanovedusa gentarna* **gen.** et **sp.n.** 1 — anterior part of body, dorsal view; 2 — head, right lateral view; 3 — head, laterofrontal view; 4 — left tegmen of holotype, male; 5 — right tegmen of holotype, male; 6 — left tegmen of paratype, female; 7 — left wing of paratype, female; 8 — male genital segment, left lateral view; 9 — male genital segment, ventrolateral view; 10 — apical portion of male genital segment, dorsal view; 11 — female genital segment, ventral view; 12 — female genital segment, right lateral view. Scale bars: 1 mm — for Figs 1–7, 0.5 mm — for Figs 8–12.

Рис. 1–12. *Emeljanovedusa gentarna* **gen.** et **sp.n.** 1 — передняя часть тела, сверху; 2 –голова, сбоку справа; 3 — голова, сбоку спереди; 4 — левое переднее крыло, голотип, самец; 5 — правое переднее крыло, голотип, самец; 6 — левое переднее крыло, паратип, самка; 7 — левое заднее крыло, паратип, самка; 8 — генитальный сегмент самца, сбоку слева; 9 — генитальный сегмент самца, сбоку снизу; 10 — верхняя часть генитального сегмента самца, сверху; 11 — генитальный сегмент самки, снизу; 12 — генитальный сегмент самки, сбоку справа. Масштаб: 1 мм — для Рис. 1–7; 0.5 мм — для Рис. 8–12.



Figs 13–16. *Emeljanovedusa gentarna* **sp.n.**: 13 — holotype, male AUF056JS; 14 — gential block of holotype, male; 15 — paratype, female ZMUC Hem003/BaltA, ventral view; 16 — paratype, female, dorsal view.

Рис. 13–16. *Emeljanovedusa gentarna* **sp.n.**: 13 — голотип, самец AUF056JS; 14 — генитальный блок, голотип, самец; 15 — паратип, самка ZMUC Hem003/BaltA, снизу; 16 — паратип, самка, сверху.

stridulatory plate. Forefemur slightly shorter than foretibia, tarsomeres subequal in length, tarsal claws small. Hindfemur slightly shorter than hind tibia; hindtibia slender, without later spine and row of 6 apical spines; hind basitarsus slightly shorter than combined length of mid and apical hind tarsomeres, hind basitarsus with 5 apical spines, midtarsomere with 5 apical spines, tarsal claws small. Male pygofer slightly protruded caudad, straight in ventral view, without any median processes. In ventral and lateral view "ventral plate" visible (very probably *lamina gonostyli* sensu Bourgoin, 1987: 114). Male anal tube long, with two acute apical processes, ventrad; anal style short. Phallic complex (aedeagus) with dorsobasal portion of the phallobase and left lateral ventrad, right anteriad and dorsal caudad spines of endosoma visible. Styles with ventral margins covered with row of setae, dorsobasal finger-like projection directed laterad, covered with setae. Female sternite VII triangular, convex, with distinct apicad acute projection. Ovipositor short, gonapophysis VIII with acute apex, gonapophysis IX with small apical projection, gonoplac short. Anal tube short with short anal style.

DIAGNOSIS. Lateral margin of pygofer lobe slightly produced caudad, but not processed. Genital styles of male about twice as long as wide at widest point, symmetrical. Style with ventral margin in lateral view almost straight, in ventral view with margins almost straight, slightly concave in apical portion; apical portion in lateral view blunt, with distinct wide incision in apical portion, in caudal view merely bent mediad; dorsal margin with huge, truncate apical process, and dorsobasal projection finger-like, with basal process visible in profile. Anal tube long, with two apical acute processes ventrad, anal style short. Female with sternite VII triangular, slightly longer in mid line than wide at base, distinctly convex, with distinct acute apical projection. Female anal tube and anal style short. Female slightly bigger than male.

AGE AND OCCURRENCE. Eocene, Lutetian, Scandinavian Peninsula amber-producing forest, Baltic amber, Denmark, East Baltic Coast.

ETYMOLOGY. Specific epithet from Old Prussian word "gentarn" — amber.

Hauptenia Szwedo, **gen.n.**

Type species: *Malenia magnifica* Yang & Wu, 1993: 86.

ETYMOLOGY. Named after Hermann Haupt, an eminent entomologist, specialist on the Hemiptera; combination with *Malenia* — genus of Derbidae. Gender: feminine.

COMPOSITION. *H. magnifica* (Yang & Wu, 1993), **comb.n.** (= *Malenia magnifica* Yang & Wu, 1993: 86), *H. jacula* (Yang & Wu, 1993), **comb.n.** (= *Malenia jacula* Yang & Wu, 1993: 89), *H. fellea* (Yang &Wu, 1993), **comb.n.** (= *Malenia fellea* Yang & Wu, 1993: 89), *H. glutinosa* (Yang & Wu, 1993), **comb.n.** (= *Malenia glutinosa* Yang & Wu, 1993:

91), *H. idonea* (Yang & Wu, 1993), **comb.n.** (= *Malenia idonea* Yang & Wu, 1993: 94).

Produsa Szwedo, **gen.n.**

Type species: *Cedusa concava* Yang & Wu, 1993: 76.

ETYMOLOGY. Combination of Latin word "productus" — produced and *Cedusa* — genus of Derbidae. Gender: feminine.

COMPOSITION. *P. concava* (Yang & Wu, 1993), **comb.n.** (= *Cedusa concava* Yang & Wu, 1993: 76), *P. cubica* (Yang & Wu, 1993), **comb.n.** (= *Cedusa cubica* Yang & Wu, 1993: 78).

Muiredusa Szwedo, **gen.n.**

Type species: *Herpis brunnea* Muir, 1914: 43.

ETYMOLOGY. Named after Frederic Muir, an eminent entomologist, specialist on the Hemiptera, combined with *Cedusa* — genus of Derbidae. Gender: feminine.

COMPOSITION. *M. brunnea* (Muir, 1914), **comb.n.**, *M. littorea* (Yeh & Yang, 1993), **comb.n.** (= *Cedusa littorea* Yeh & Yang, 1993 in Yang & Wu, 1993: 83), *M. ignota* (Yeh & Wu, 1993), **comb. n.** (= *Cedusa ignota* Yeh & Wu, 1993: 83). Probably also there belong not described species from Viet Nam mentioned by Fennah [1978].

Australian species placed in the genus *Cedusa* [Fletcher, 2005]: *Cedusa jacobii* Metcalf, 1945: 131 nec *Lamenia angustifrons* Melichar, 1905: 285 (= *Gonyphlepsia angustifrons* Jacobi, 1928: 40; = *Cedusa angustifrons* (Jacobi, 1928): Muir, 1934: 565; *Cedusa kulia* (Kirkaldy, 1906) = *Lamenia kulia* Kirkaldy, 1906: 403; = *Cedusa kulia* (Kirkaldy, 1906): Muir, 1913: 36 and *Cedusa spinosa* Metcalf, 1945: 134 [nec *Cedusa venosa* Fowler, 1904: 112 = *Gonyphlepsia venosa* Jacobi, 1928: 40; = *Cedusa venosa* (Jacobi, 1928): Muir, 1934: 565], very probable represents separate genus, but the species ascribed to the genus *Cedusa* in broad sense call for detailed revisionary studies.

Discussion

The tribe Cedusini Emeljanov, 1992 is regarded as one of the basal units within scheme of Derbidae evolution proposed by Emeljanov [1995]. It is characterized by the appearance of the subantennal processes (subantennal lobes, subantennal crests) with the absence of hypertrophied antenna [Emeljanov, 1995]. The interesting feature of the tribe is that achilid-like model of clavus structure of the tegmenen occurrs together with cixiid-like type of clavus, present in higher Derbidae [Emeljanov, 1995]. He also believed that converging of the nodal vein $ScRA_1$ of the hind wing with the hook is characteristic for this tribe. This state is present in extant representatives of Cedusini, but in extinct genus *Emeljanovedusa* **gen.n.** branch $ScRA_1$ is still long, and remote from hook of the wing coupling apparatus. Regarding other features of the tegmen and wing venation it looks that almost all genera, excluding *Melusa* and *Eocenchrea* represents very "conservative" model of the venation. Such conservatism is observed also in respect to structure of the head and general structure of the genitalia in both sexes. The finding of the extinct representative of the Cedusini, very closely related to some extant genera is of extreme importance. It is the oldest known representative of the tribe, bearing most of characters common with the extant taxa. It looks probable that all species of the genus *Cedusa* in Americas resulted from the radiation of the ancestral form with slightly asymmetric styles, in which this feature is conserved. The other extant genera — *Malenia*, *Hauptenia* **gen.n.**, *Produsa* **gen.n.**, and *Muiredusa* **gen.n.** are charactersitic of symmetrical male styles, as well as extinct *Emeljanovedusa* **gen.n.**. As the internal classification of the Cedusini is still far from the final resolution, the fossil representatives could help in future phylogentic analysis of the taxa ascribed to the tribe. The finding of Cedusini in fossil state also is important for palaeogeographic and palaeoclimatic reconstructions. The study of extinct Cedusini, and other Baltic amber inclusions as well, is vital for better knowledge in taxonomy and phylogeny, and understanding of taphonomic, palaeoclimatological and palaeoecological processes.

ACKNOWLEDGEMENTS. I wish to thank to the late Professor Nils Møller Andersen for his help and assistance during the stay in Zoological Museum, University of Copenhagen in 2003. The paper resulted from the research visit funded by the COBICE program and research grant of the State Scientific Committee/Ministry of Scientific Research and Information Technologies 2P04C 100 26 "Achilidae (Insecta: Hemiptera: Fulgoromorpha) of the Eocene Baltic amber".

References

Banaszkiewicz M. & Szwedo J. 2005. Notes on Otiocerinae with description of a new tribe from Madagascar and Africa (Hemiptera: Fulgoromorpha: Derbidae) // Ann. Zool. Vol.55. No.2. P.223–241.

Bourgoin Th. 1987. A new interpretation of the homologies of the Hemiptera male genitalia illustrated by the Tettigometridae (Hemiptera, Fulgoromorpha) // Proc. 6th Auchenorrhyncha Meeting. Turin, Italy, 7–11 Sept. 1987. P.113–120.

Broomfield A.F. 1985. Taxonomy of Neotropical Derbidae in the new tribe Mysidiini (Homoptera) // Bull. Brit. Mus. (Nat. Hist.). Entomol. Vol.50. No.1. P.1–152.

Caldwell J.S. & Martorell L.F. 1951. Review of the Auchenorrhynchous Homoptera of Puerto Rico. Part II. The Fulgoroidea except Kinnaridae // Jour. Agric. Univ. Puerto Rico. Vol.34. No.2. P.133–209+i–x.

Emeljanov A.F. 1991. [Toward the problem of the limits and subdivisions of Achilidae (Homoptera, Cicadina)] // Entomol. Obozr. Vol.70. No.2. P.373–392. [In Russian. English translation published in Entomol. Rev. 1992. Vol.71. No.1. P.53–73.]

Emeljanov A.F. 1992a. [Two new tribes, a new genus and a new species of the family Derbidae (Homoptera, Fulgoroidea)] // Vestnik Zoologii. No.4. P.19–23. [In Russian].

Emeljanov A.F. 1992b. [Description of tribes of the subfamily Achilinae (Homoptera, Achilidae) and revision of their composition] // Entomol. Obozr. Vol.71. No.3. P.574–594. [In Russian. English translation published in Entomol. Rev. 1993. Vol.72. No.6. P.7–27].

Emeljanov A.F. 1994. [The first fossil find of the family Derbidae and a redescription of the Paleogene genus *Hooleya* Cockerell (Achilidae) (Insecta: Homoptera, Fulgoroidea)] // Paleont. Zhurn. No.3. P.76-82 + 1 Plate (No.VII). [In Russian. English translation published in Paleont. J. Vol.28. No.3. P.92-101].

Emeljanov A.F. 1995. [On the System and Phylogeny of the Family Derbidae (Homoptera, Cicadina)] // Entomol.

Obozr. Vol.73. No.4. P.783–811. [In Russian. English translation published in Entomol. Rev. Vol.75. No.2. P.70–100].
Emeljanov A.F. 2002. [A record of Derbidae (Insecta, Homoptera, Fulgoroidea) in the Miocene of the Northern Caucasus] // Paleont. Zhurn. No. 3. P.49–50. [In Russian. English translation published in Palaeont. J. Vol. 36. No.3. P.277–278].
Emeljanov A.F. & Fletcher M.J. 2004. *Hemielissum evansi*, a new genus and species of Breddiniolini (Hemiptera: Fulgoromorpha), being the first Australian record of the tribe, with a discussion of the taxonomic position of the Breddiniolini // Austral. J. Entomol. Vol.43. P.38–42.
Emeljanov A.F. & Shcherbakov D.E. 2000. Kinnaridae and Derbidae (Homoptera, Fulgoroidea) from the Dominican amber // N. Jahrb. Geol. Paläont. Monatshefte. No.7. P.438–448.
Fennah R.G. 1950. A generic revision of the Achilidae (Homoptera: Fulgoroidea) // Bull. Brit. Mus. (Nat. Hist.). Vol.1. 170 pp.
Fennah R.G. 1952. On the generic classification of Derbidae (Fulgoroidea), with descriptions of new Neotropical species // Trans. R. Entomol. Soc. London. Vol.103. No.4. P.109–170.
Fennah R.G. 1958. Fulgoroidea from West Africa // Bull. I.F.A.N. T.20. Ser.A. No.2. P.460–538.
Fennah R.G. 1961. Le Parc national Niolo–Koba. XXXIII. Homoptera Fulgoroidea // Mem. I.F.A.N. No.62. Fasc.2. P.305–320.
Fennah R.G. 1978. Fulgoroidea (Homoptera) from Vietnam // Ann. Zool. Vol.34. No.9. P.207–297.
Fletcher M.J. 2005. Species of Derbidae known to occur in Australia // http://www.agric.nsw.gov.au/Hort/ascu/fulgor/derb01.htm. Document 4116, submitted 05 April 2005.
Flynn J.E. & Kramer J.P. 1983. Taxonomic Study of the Planthopper Genus *Cedusa* in the Americas (Homoptera: Fulgoroidea: Derbidae) // Entomography. No.2. P.121–260.
Fowler W. 1904. Order Rhynchota. Suborder Hemiptera-Homoptera. (Continued) // Biologia Centrali-Americana. Vol.1. P.109–124.
Haupt H. 1929. Neuenteilung der Homoptera-Cicadina nach phylogenetisch zu wertenden Merkmalen // Zool. Jahrb. Syst. Okol. Bd.58. P.173–286.
Horváth G. 1907. Hemiptera nova vel minus cognita ex regione palearctica. I. // Ann. Mus. Nat. Hungarici. Vol.5. P.289–323.
Jacobi A. 1928. Rhynchota Homoptera. 1. Fulgoridae und Cercopidae. In: Results of Dr E. Mjoberg's Swedish scientific expeditions to Australia 1910-1913 // Arkiv Zool. Bd.19. No.28. P.1–50.
Kirkaldy G.W. 1906. Leafhoppers and their Natural Enemies. Pt IX. Leafhoppers — Hemiptera // Bull. Hawaiian Sugar Pl. Assoc. Div. Ent. Vol.1. No.9. P.271–479.
Kirkaldy G.W. 1909. On a new Derbid Homopteron from New Zealand and notes on other Hemiptera // Proc. Hawaiian Ent. Soc. Vol.2. P.80–81.
Kramer J.P. 1986. Supplement to a Taxonomic Study of the Planthopper Genus *Cedusa* in the Americas (Homoptera: Fulgoroidea: Derbidae) // Entomography. No.4. P.245–314.
Martins-Neto R.G., Gallego O.F. & Melchor R.N. 2003. The Triassic insect fauna from South America (Argentina, Brazil and Chile): a checklist (except Blattoptera and Coleoptera) and descriptions of new taxa. P.229–256 // Proc. 2nd Congress on Palaeoentomology "Fossil Insects". Kraków, Poland, 5–9 September, 2001. Acta zool. cracov. Vol.46 (Suppl. — Fossil Insects). P.1–440.
Melichar L. 1905. Beitrag zur Kenntnis der Homopterenfauna Deutsch-Ost-Afrikas // Wien. Ent. Zeit. Jhrg.24. P.279–304.
Metcalf Z.P. 1945. General Catalogue of the Homoptera. Fascicle IV Fulgoroidea. Pt.4 Derbidae. Smith College, Northampton, Massachusetts, U.S.A. P.1–212+251–252.
Muir F. 1913. Part II. Derbidae. On Some New Species of Leaf-Hoppers. // Rep. Work Exp. Stat. Hawaiian Sugar Pl. Assoc. Entomol. Ser. Bull. No.12. P.28–92.
Muir F. 1914. On some Derbidae from Formosa and Japan // Proc. Hawaiian Ent. Soc. Vol.3. No.1. P.42–52.
Muir F. 1934. New and little-known Fulgoroidea (Homoptera) // Ann. Mag. Nat. Hist. Ser.10. Vol.14. P.561–586.
Pinto I.D. 1956. Arthropodes da Formacao Santa Maria (Triassico Superior) do Rio Grande do Sul, com noticias sobre alguns restos vegetais // Bol. Soc. Bras. Geol. Vol.5. No.1. P.79–95.
Poinar Jr. G.O. & Poinar R. 1999. The Amber Forest: A Reconstruction of a Vanished World. Princeton University Press. 216 pp.
Synave H. 1973. Monographie des Derbidae africains (Homoptera-Fulgoroidea) // Etudes Cont. Afr. Fasc.2. P.1–223.
Szwedo J. 2002. Amber and amber inclusions of planthoppers, leafhoppers and their relatives (Hemiptera, Archaeorrhyncha et Clypaeorrhyncha) // Denisia, 04, zugleich der Kataloge der OÖ Landesmuseum Linz, N.F. 176. P.37–56.
Szwedo J. 2004. A new Derbidae planthopper *Copallinges chiapasensis* gen. et sp. nov. from Oligocene/Miocene Mexican amber (Hemiptera: Fulgoromorpha) // Pol. Pismo entomol. Vol.73. No.4. P.291–298.
Szwedo J. 2005. Notes on Otiocerini with a second record of Derbidae in Eocene Baltic amber (Hemiptera: Fulgoromorpha: Derbidae) // Ins. Syst. Evol. Vol.36. No.2. P.161–172.
Szwedo J., Bourgoin Th. & Lefebvre F. 2004. Fossil Planthoppers (Hemiptera: Fulgoromorpha) of the World. An annotated catalogue with notes on Hemiptera classification. Studio 1. Warszawa. 208 pp.
Szwedo J. & Ross A.J. 2003. *Cedusa baylissae* sp. nov. from Oligocene/Miocene Mexican amber (Hemiptera: Fulgoromorpha: Derbidae) // Ann. Upper Sil. Mus. Entomol. No.12. P.37–46.
Van Stalle J. 1984. New and Interesting African Derbidae (Homoptera: Fulgoroidea) // Bull. Inst. r. sci. nat. Belg. Vol.55. No.1. P.1–61.
Wilson M.R. 1987. African Derbidae (Homoptera, Fulgoroidea): taxonomic notes with descriptions of new species collected mainly from coconut // J. Nat. Hist. Vol.21. P.567–595.
Yang C.-T. & Wu R.-H. 1993. Derbidae of Taiwan (Homoptera: Fulgoroidea). Department of Entomology, National Chung Hsing University, Taichung, Taiwan, ROC. vi + 230 pp.