

**A new Derbidae planthopper *Copallinges chiapasensis* gen. et sp. n.  
(Hemiptera: Fulgoromorpha) from Oligocene/Miocene Mexican amber**

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**ABSTRACT.** *Copallinges chiapasensis* gen. et sp. n. (Derbidae: Cenchreini) is described from the Oligocene/Miocene Mexican amber. It seems to be related to the extant monotypic genus *Cenanges* FENNAH, 1952, known from the Dominica Island, as well as to some other Cenchreini. *Copallinges* gen. n. differs from all extant Cenchreini genera in combination of characters concerning the tegmen venation and male genital block. It is the second record of Derbidae from the Mexican amber and fourth record of the family from New World fossil resins.

**KEY WORDS:** Hemiptera, Fulgoromorpha, Derbidae, Cenchreini, new genus, new species, fossils, Mexican amber, Oligocene/Miocene.

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INTRODUCTION

The most famous fossil resin of the New World is Dominican amber, the second is Mexican amber, also called "Chiapas amber". Both resins are known as a rich source of fossils (POINAR 1992, 1999, POINAR & POINAR 1999, SZWEDO 2002). These fossil resins originated from a leguminous tree of the genus *Hymenaea* of Fabales and Caesalpiniaceae family (POINAR 1999, CARIDAD 1999) and are aged Oligocene/Miocene. Mexican amber originated in Chiapas, which is the southernmost Mexican state, bordered on the south by Guatemala, on the west by Oaxaca, on the northwest by Veracruz, and on the north by Tabasco. Chiapas is relatively isolated from the rest of Mexico, with coastal plains on both the north and south borders and mountain ranges rising from the inner portion of the coastal plain, and a central depression. Most of the amber deposits occur in the northern mountain ranges, referred to as Chiapas highlands, and most of amber mines are located in Simojovel area (POINAR 1992).

Mexican amber occurs in primarily marine calcareous sandstone and silt with beds of lignite, in association with the Balumtun Sandstone of the Early Miocene and La Quinta

formation of the Late Oligocene (POINAR 1992, KRUMBIEGEL & KRUMBIEGEL 1996). Radiometric assignment dates the amber bearing strata from 22.5 to 26 Ma (BERGGREN & VAN COUVERING 1974). The amber can be found in the lignitic beds or within some distance from them. Mexican amber is mined from the lignite beds or collected from alluvial deposits (GRIMALDI 1996, RICE 1987).

Mexican amber is known as a source of fossils, but few of them were formally described, e.g. spiders and beetles (PETRUNKEVITCH et al. 1963). The information about planthopper inclusions is scarce - FENNAH (1963) described a new genus and species named *Oeclixius amphion* FENN., *Mnemosyne* sp. of the family Cixiidae, and a nymph of the planthopper family Flatidae; later STROIŃSKI & SZWEDO (2000) described *Tonacatecutlius gibsoni* STR. et SZW. of the family Nogodinidae, and SZWEDO & ROSS (2003) identified *Cedusa baylissae* SZW. et ROSS of Derbidae. Other fossil representatives of the family Derbidae are known from the Dominican amber - *Cedusa credula* EM. et SHCH. and *Dysimia imprudens* EM. et SHCH. (EMELJANOV & SHCHERBAKOV 2000), and Baltic amber - *Positrona shcherbakovi* EM. (EMELJANOV 1994b). From Miocene strata of Stavropol' (Northern Caucasus Mts.) another species *Mysidioides migdisovae* EMELJANOV, 2002, of the tribe Otiocerini has been described recently (EMELJANOV 2002). Another record of the family from Upper Triassic strata of Brazil (PINTO 1956) is based on misinterpreted material (EMELJANOV 1994b, SZWEDO 2002, SZWEDO et al. 2004). This fossil, known as *Sanctipaulus mendesi* PINTO, 1956, has been transferred to Trichoptera, undetermined family, by MARTINS-NETO & al. (2003). A few other unnamed Derbidae are known from the Oligocene/Miocene Dominican amber - specimen figured in POINAR & POINAR (1999) and Eocene Bitterfeld amber (SZWEDO 2002).

Representatives of the family Derbidae may be difficult to identify. They are fragile-winged insects 4-14 mm long with bright coloration (O'BRIEN 2002). Most of them bear a row of apical spines on the second hind tarsomere, still some of them (e.g. *Sayiana* BALL, *Otiocerus* KIRBY) have a single spine on each side. In most derbids, the apical segment of rostrum is as long as wide, but in some genera (e.g. *Ipsnola* SIGNORET, *Goneokarella* FENNAH or *Neodawnaria* O'BRIEN - representing more basal tribes of Derbidae) it is longer. Body size varies from 4 to 16 mm.

Extant Derbidae occur in three common habitus, the first is a group of moth-like insects with their tegmina and wings spread, the second group has tectiform tegmina, while derbids belonging to the third group hold their tegmina and wings curled in a tube at an angle of 45° to the body axis. The only common features of such different forms are the characters of genitals in both sexes (O'BRIEN & WILSON 1985). The higher classification of extant Derbidae has recently been presented by EMELJANOV (1994a), but there are still numerous taxonomic problems within the group and Derbidae are sometimes believed to be paraphyletic. Representatives of the family occur in temperate and tropical zones (mainly in the New World and Australian regions). Nymphs of Derbidae planthoppers seem to be obligatory fungivorous, they have been collected under bark of live trunks and decaying logs (O'BRIEN 1991, YANG & YEH 1994). Imagines occur above the ground, they are

usually associated with moths on ferns. Most derbids are r

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Type species: *Copallin*

### Etymology

Combination of the Na "Cenanges" - planthopper g

### Diagnosis

Related to *Cenanges* F block characters: veins R apicad of claval veins junc forking apicad of claval ap oblique (*ir* parallel to cost more apical (not at same le forking (slightly apicad of almost straight and widened style long, reaching almost

### Description

Frons narrow, gradually distinctly rounded. Clypeu lateral view. Antenna shor segment as wide as long.

usually associated with monocots (particularly palms) and woody dicots, a few species feed on ferns. Most derbids are monophagous or strictly oligophagous (WILSON et al. 1994).

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#### SYSTEMATICS

Family Derbidae SPINOLA, 1838  
Subfamily Derbinae SPINOLA, 1838  
Tribe Cenchreini MUIR, 1917

#### *Copallinges* gen. n.

Type species: *Copallinges chiapasensis* sp. n.

#### Etymology

Combination of the Nahuatl language word "copalli" - resin of *Hymenaea* tree and "Cenanges" - planthopper genus. Gender: masculine.

#### Diagnosis

Related to *Cenanges* FENNAH, 1952, but differs in tegmen venation and male genital block characters: veins R and M separated more apically than in *Cenanges*; R bifurcated apicad of claval veins junction (at the level of claval veins junction in *Cenanges*); M first forking apicad of claval apex (at the level of claval apex in *Cenanges*); veinlet *ir* distinctly oblique (*ir* parallel to costal margin in *Cenanges*); veinlets *im* at almost the same level, more apical (not at same level and more cephalad in *Cenanges*); veinlet *m-cu* basad of M forking (slightly apicad of M forking in *Cenanges*); apical margin of male genital style almost straight and widened at apex (distinctly rounded and not widened in *Cenanges*); anal style long, reaching almost the apices of anal tube processes (anal style short in *Cenanges*).

#### Description

Frons narrow, gradually widening in basal portion, medially ecarinate, in lateral view distinctly rounded. Clypeus slightly longer than frons, tricarinate, distinctly curved in lateral view. Antenna short. Rostrum extending slightly beyond hind coxae, with apical segment as wide as long.

Pronotum quite short, with lateral marginal carinae forming large and deep foveae.

Fore and mid legs similar, with femora, tibiae and tarsi of similar length, respectively; femora slightly shorter than tibiae, tarsomeres subequal in length. Hind femur shorter than hind tibia, hind tibia without lateral teeth and with 8 apical teeth; tibio-metatarsal formula 8 : 7 : 7; hind basitarsomere slightly longer than combined length of mid and apical tarsomeres; tarsal claws distinct, slender, pulvillus quite big.

Tegmen with anterior and posterior margins subparallel, apical margin deeply rounded, delicately serrate, clavus about as long as half of total length of tegmen. Papillate portion of tegmen's anterior margin quite long, covering median third of costal margin. Sc+R+M stalk quite long, forked about  $\frac{1}{3}$  of clavus length; ScR forked at the level of Cu forking, slightly apicad of claval veins junction; ScRA<sub>1</sub> separated at the level of *m-cu* veinlet, RA<sub>2</sub> distinctly sigmoid; RP with two terminals; veinlet *ir* distinctly oblique; M first forking slightly apicad of apex of clavus, anterior branch forked slightly apicad of RP forking, just before veinlet *r-m*, posterior branch forked more cephalad, slightly basad of *icu* veinlet, M with four terminals, veinlets *im* placed distinctly apicad, almost at the same level; CuA forked cephalad of apex of clavus, with two terminals, veinlet *icu* short; clavus with apex not reaching half of tegmen length, Pcu and A<sub>1</sub> junction slightly apicad of half of clavus length, Pcu with sensory pits.

Wing only slightly shorter than tegmen, ScRA short, RP curved in apical portion, M single, veinlet *r-m* long, slightly arcuate, CuA with two terminals, forked basad of half of length of *rm* apical cell.

Pygofer of male with lateral portions mildly rounded, ventral margin of pygofer with median process. Genital styles in ventral view with mildly triangular projection mediad; in lateral view with posterior margin almost straight and widened. Anal tube long, with two apical processes, anal style long.

Female unknown.

#### *Copallinges chiapasensis* sp. n.

(Figs 1-8)

#### Diagnosis

Anal segment of male moderately long, posterior margins in lateral view mildly rounded, nearly straight in posteroventral portion, with distinct, acutely triangular medioventral process. Genital styles in lateral profile expanding distad, almost straight at apex, widened in apical portion, with triangular process and hooked process on dorsal margin, lateral rib distinct. Aedeagus complex, with two flagellar processes directed cephalad, and short acute process directed posteriad.

#### Description

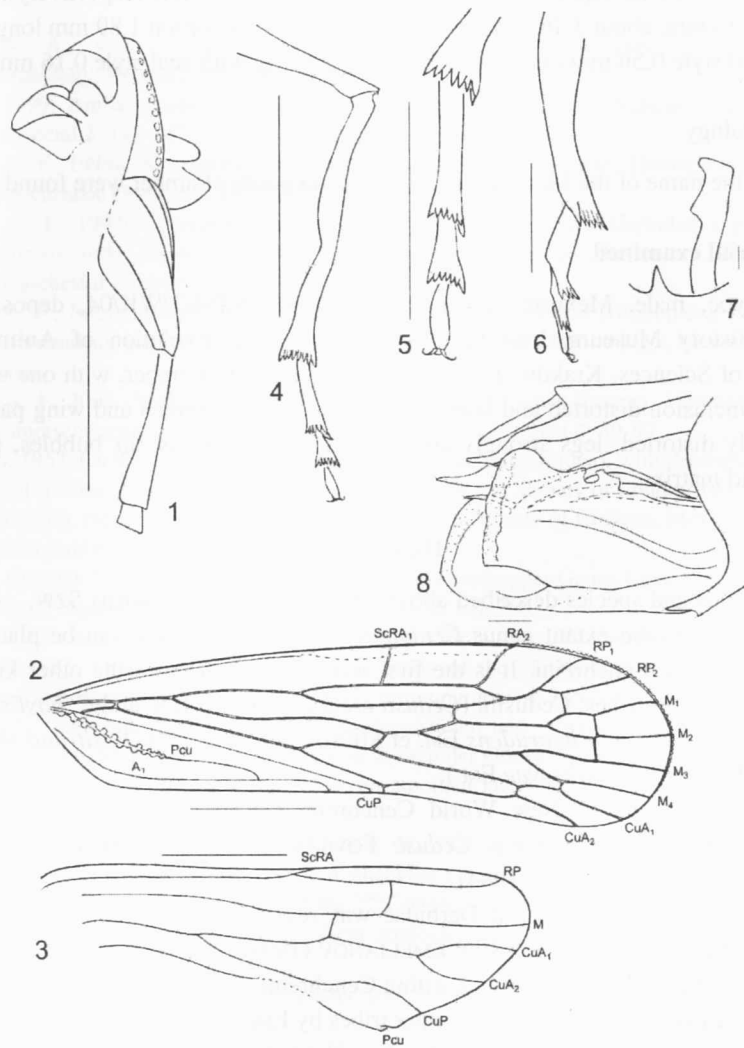
(Measurements may be slightly skewed because of the state of preservation of the insect (compression) and optical properties of amber.) Total length 4.74 mm, length of

body 3.39 mm. Tegmina amber. Frons (0.7 mm) distinct posteroventral incision, lateral carina of pronotum wide as long, reaching sli



**Figs 1-8.** 1 – head in latero-ventral view, 2 – lateral portion of wing (scale bar 1 mm), 3 – right hind tarsus (scale bar 1 mm), 4 – genital block in right lateral view, 5 – genital block in ventral view, 6 – genital block in right lateral view.

body 3.39 mm. Tegmina and wings hyaline, without colour pattern to be observed in amber. Frons (0.7 mm) slightly shorter than clypeus (0.84 mm), compound eye with distinct posteroventral incision, ocelli lacking, antenna short, sunk in deep fovea formed of lateral carina of pronotum, rostrum 0.77 mm long, with apical segment short (0.17 mm) as wide as long, reaching slightly beyond hind coxae.



**Figs 1-8.** 1 – head in latero-frontal view (scale bar 1 mm), 2 – tegmen (scale bar 1 mm), 3 – visible portion of wing (scale bar 1 mm), 4 – left hind leg (scale bar 1 mm), 5 – left hind tarsus (scale bar 0.5 mm), 6 – right hind tarsus (scale bar 0.5 mm), 7 – pygofer and right genital style (scale bar 0.1 mm), 8 – genital block in right lateral view (scale bar 0.1).

Pronotum quite short, with distinct lateral marginal carinae forming large and deep foveae. Mesonotum weakly visible, probably with three longitudinal carinae. Fore femur 0.91 mm long, fore tibia 0.94 mm long, fore tarsus 0.35 mm long, tarsomeres subequal in length 0.16 mm. Hind femur 0.75 mm long, hind tibia slender, without lateral spines, 1.4 mm long, hind tarsus 0.73 mm long with basitarsomere longer (0.47 mm) and mid and apical tarsomeres subequal in length (0.26 mm and 0.24 mm respectively). Length of tegmen, 4.14 mm, about 3.46 times as long as wide, claval portion 1.89 mm long.

Genital style 0.56 mm long, anal tube 0.62 mm long with anal style 0.16 mm long.

#### Etymology

From the name of the Mexican state in which deposits of amber were found - Chiapas.

#### Material examined

Holotype, male. Mexican amber inclusion, No. MP/4/1/WK/04, deposited in the Natural History Museum, Institute of Systematics and Evolution of Animals, Polish Academy of Sciences, Kraków. Preservation - huge piece of amber, with one side cut and polished; inclusion distorted and laterally compressed, left tegmen and wing partly spread, wing partly distorted, legs strongly compressed. Syninclusions: air bubbles, particles of detritus and matrix.

#### DISCUSSION

The genus and species described above - *Copallinges chiapasensis* SZW. - seems to be closely related to the extant genus *Cenanges* FENNAH, 1952, and can be placed without doubt in the tribe Cenchreini. It is the first record of this tribe as the other known fossil Derbidae represent tribes: Cedusini (*Cedusa credula* EM. et SHCH. and *C. baylissae* SZW. et ROSS), Derbini (*Dysimia imprudens* EM. et SHCH.) and Otiocerini (*Positrona shcherbakovi* EM. and *Mysidioides migdisovae* EM.).

The extant fauna of New World Cenchreini (sensu FENNAH) was catalogued by O'BRIEN (1982) with the genus *Cedusa* FOWLER omitted, and revised by FLYNN & KRAMER (1983) and KRAMER (1984).

The generic classification of Derbidae was revised by FENNAH (1952) and modern tribal classification was presented by EMELJANOV (1994a). FENNAH (1952) mentioned that there were some well-marked groups within Cenchreini. Some genera placed by him in this tribe were subsequently moved to the other tribes by EMELJANOV (1994a).

Regarding characters provided in his key, the new genus described above presents a mosaic of characters observed in different Cenchreini genera with a few specific ones. According to FENNAH's (1952) modified key presented by O'BRIEN (1982), *Copallinges* SZW. belongs to the group of genera together with *Cenchrea* WESTWOOD, *Contigucephalus* CALDWELL, *Cenanges* FENNAH, *Neocenchrea* METCALF, *Persis* STÅL, *Omolicna* FENNAH, *Anchimothon* FENNAH and *Phaciocephalus* KIRKALDY. Within this group it belongs to a

complex of genera with *Anapersis* FENN., *Cenanges* FENN., *Omolicna* FENN. From all the level of CuA forking, b

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complex of genera with long subcostal cell, i.e. together with *Neocenchrea* METC., *Anapersis* FENN., *Cenanges* FENN., *Anchimothon* FENN., *Phaciocephalus* KIRK. and *Omolicna* FENN. From all these genera *Copallinges* SZW. differs by Sc+R forking placed at the level of CuA forking, both placed apicad of claval veins junction.

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