Zootaxa 3946 (3): 347–360
www.mapress.com/zootaxa/

Article

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

http://dx.doi.org/10.11646/zootaxa.3946.3.3
http://zoobank.org/urn:lsid:zoobank.org:pub:8D7575DB-636C-4473-91C3-A58C1E5F9E73

The Tanytarsini (Diptera: Chironomidae) in the collection of the Museum of Amber Inclusions, University of Gdańsk

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Abstract

Non-biting midges of the tribe Tanytarsini collected in the Museum of Amber Inclusions, University of Gdańsk, Poland, are reviewed. Among over 1500 chironomid specimens examined (inclusions in Baltic amber), 44 Tanytarsini individuals were found, of which 27 well preserved specimens were determined to 7 species, including 3 species described as new. *Stempellinella electra* **sp. nov.** (male) displays morphological hypopygial characters unique for the genus, and the antenna composed of 13 flagellomeres. A new checklist of fossil and extant species of this genus is also given, including *Stempellinella sofiae* (Fusari *et* Lamas, 2014) **comb. nov.** *Tanytarsus glaesarius* **sp. nov.** (male) is the only Eocene species of the genus with a reduced number of antennal flagellomeres. *Tanytarsus protogregarius* **sp. nov.** (male) is the oldest known representative of the *gregarius* species group. Notes on phylogenetic relations of the new species with their extant congeners are also provided.

Key words: Diptera, Chironomidae, Tanytarsini, taxonomy, new species, Eocene, amber

Introduction

The Museum of Amber Inclusions (MAI) was established in 1998 as one of laboratories of the Department of Invertebrate Zoology and Parasitology at University of Gdańsk (UG), Poland, and is focused on animal inclusions in Baltic amber. During the 17-year activity, the Museum became the holder of one of the largest collections of animal inclusions in Poland and Europe—nearly 15000 specimens, catalogued and available to research (Szadziewski, pers. comm.). Recently, after relocation to a new building in Gdańsk-Oliwa, the classic exposition of the Museum was transformed into an interactive form, named "Life in the amber forest", adorned with selected animal, plant and inorganic inclusions in Baltic amber, as well as other resins of diverse age and origin (Fig. 1).

In the collection we found a number of chironomid specimens, including the Tanytarsini. Among them, individuals of three unknown species were studied in detail, and herein they are presented. Thereby the number of all known Eocene Tanytarsini increases to 15 in 7 genera (*cf.* Zakrzewska & Giłka 2014).

Material and methods

In this study 1522 chironomid individuals were examined, all as inclusions in Baltic amber (sorted materials, in part). The amber was cut into small pieces, ground and polished manually. The Museum register numbers were marked with letters assigned to smaller cut-off amber pieces. Measurements of specimens are in µm, except for the total length (in mm, rounded off to the first decimal place). The body was measured from the antennal pedicel to the end of the gonostylus, and the wing from the arculus to the tip. Lengths of leg segments and palpomeres were rounded off to the nearest 5 and 1 µm, respectively. The antennal, leg and venarum ratios (AR, LR, VR) were calculated to the second decimal place. Wherever possible, the morphological terminology and abbreviations follow Sæther (1980). The photographs were taken using the classic microscope PZO Biolar SK14 and the Helicon Focus 6 image stacking software. All the materials studied are deposited in the collection of the MAI, UG, Poland.

Accepted by B. Rossaro: 19 Jan. 2015; published: 10 Apr. 2015

FIGURE 1. The exposition "Life in the amber forest" of the Museum of Amber Inclusions, Department of Invertebrate Zoology and Parasitology, Faculty of Biology, University of Gdańsk.

Results

The chironomid specimens examined altogether account for over 10% of animal inclusions of the Museum. In this large collection, 69 specimens of the subfamily Chironominae (c. 4.5% of all Chironomidae) including 44 individuals of the tribe Tanytarsini (c. 2.9%) were found, of which 27 specimens are sufficiently well preserved to be accurately identified and/or described. They belong to 7 species in 3 genera, including 3 unknown species described below.

Systematic review

Family: Chironomidae Newman, 1834

Subfamily: Chironominae Newman, 1834

Tribe: Tanytarsini Zavřel, 1917

Genus: *Corneliola* Giłka *et* Zakrzewska, 2013

***Corneliola avia* Giłka *et* Zakrzewska, 2013**

Corneliola avia Giłka *et* Zakrzewska, 2013: Giłka *et al*. 2013b: 575 (male, female; Eocene Baltic amber, Rovno).

Material examined. Adult specimens: 12 males and 4 females in 4 amber pieces (from left to right in Fig. 2A; Eocene, ~45–40 Ma, Baltic amber, Gulf of Gdańsk): 5 males (MAI-1263, 34 x 25 x 8 mm), incl. 1 male in cut-off piece (MAI-1263a, 15 x 9 x 4 mm), animal syninclusions: Collembola (2 ind.); 1 male (MAI-5387a, 12 x 9 x 8 mm), animal syninclusions: Coleoptera (1 ind., MAI-5387a), Diptera Brachycera (1 ind., MAI-5387); 1 male in amber preserved in plastic mass (MAI-322, 6 x 4 x 2 mm); 5 males and 4 females (MAI-4656, triangular, c. 40 mm wide, 25 mm thick), animal syninclusions: Dolichopodidae (3 ind.).

Remarks. Diagnostic characters of the specimens examined (Fig. 2B) are consistent with those given in the original description (Giłka *et al*. 2013b). Our present study indicates that this species, next to *Tanytarsus serafini* Giłka, 2010 (see below), is one of the most frequent Tanytarsini in Eocene Baltic amber, and confirms that amber collected from Rovno and Gulf of Gdańsk was forming in the same period and place.

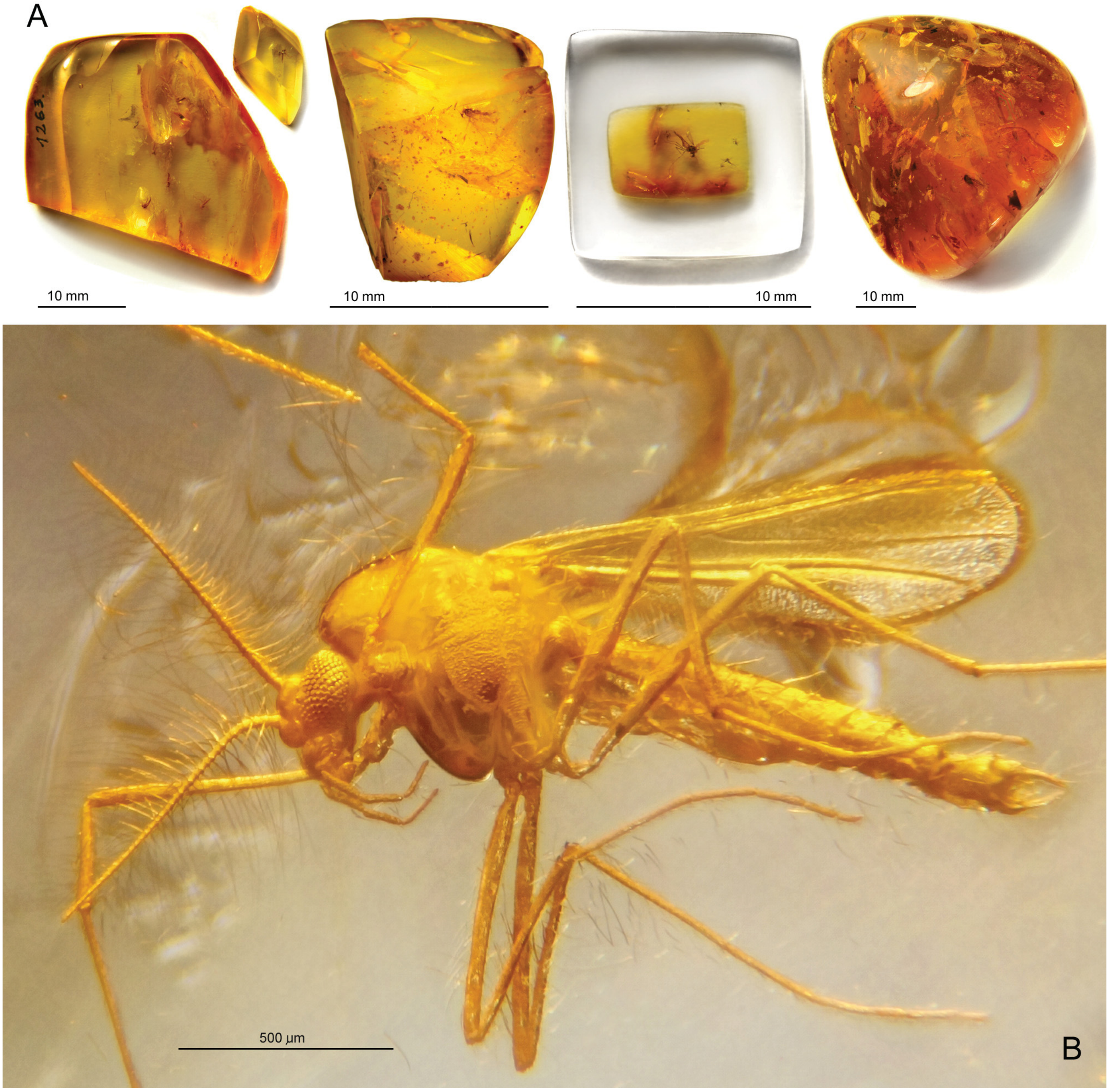

FIGURE 2. *Corneliola avia* Giłka *et* Zakrzewska, 2013 (Eocene, ~45–40 Ma; Baltic amber, Gulf of Gdańsk). **A**—specimens in amber pieces (from left to right): MAI-1263 (4 males) and MAI-1263a (1 male); MAI-5387a (1 male); MAI-322 (1 male in amber preserved in plastic mass); MAI-4656 (5 males and 4 females); **B**—male, habitus (MAI-1263).

Genus: *Stempellinella* Brundin, 1947

***Stempellinella electra* Giłka *et* Zakrzewska, sp. nov.**

Type material. Holotype. Adult male, complete specimen with large mite attached under right wing, preserved in 14 x 11 x 2 mm piece of amber (Eocene, ~45–40 Ma, Baltic amber, Gulf of Gdańsk; MAI-4295a; Fig. 3A); animal syninclusions: Acari (2 ind., MAI-4295a), Mycetophilidae (1 ind., MAI-4295b), Aphidoidea (1 ind., MAI-4295).

Derivatio nominis. Adjective in feminine form derived from the Latin noun '*electrum*', amber.

Diagnosis. Antennal flagellum composed of 13 segments, flagellomeres 11–13 fused in part. Anal point with slender distal section and strong crests. Superior volsella elongated, with round apex, bearing 2 setae. Stem of median volsella club-shaped, with wide pectinate and foliate lamellae. Inferior volsella arcuate, tapering to pointed apex armed with 2 stout setae.

FIGURE 3. *Stempellinella electra* **sp. nov.**, adult male, holotype MAI-4295a (Eocene, ~45–40 Ma; Baltic amber, Gulf of Gdańsk). **A**—inclusion; **B**—habitus; **C**—head; **D**, **E**—antenna photographed in transmitted (**D**) and reflected light (**E**) (white arrows: borders between well discernible flagellomeres; grey arrows: incomplete fusion); **F**—wing photographed in transmitted light.

FIGURE 4. *Stempellinella electra* **sp. nov.**, adult male, holotype MAI-4295a (Eocene, ~45–40 Ma; Baltic amber, Gulf of Gdańsk). **A**–**C**—hypopygium, dorsal aspect, photographed in transmitted light (**A**), reflected light (**B**), and drawn (**C**); **D**—median volsella (magnified c. 2 times relative to hypopygium drawn).

Description. Adult male (n = 1)

Total length c. 1.5 mm; wing length c. 890 µm.

Head (Fig. 3C–E). Eyes bare, small, ovoid, broadly separated. Frontal tubercles conical, c. 10 µm long. Antennal flagellum composed of 13 segments of which 11 are well discernible, flagellomeres 11–13 fused in part, AR 0.76 (when flagellum measured as 11-segmented), AR 0.62 (as 12-segmented), AR 0.50 (as 13-segmented); plume fully developed (Fig. 3D, E). Length of palpomeres 2–5 (in µm): c. 30, 64, 84, 133. Clypeals present, but cannot be counted.

Thorax (Fig. 3B). Ac at least 11, Dc at least 7-8 on each side, Pa 1 on each side, Scts at least 4.

Wing (Fig. 3F). Slender, with anal lobe weak, broadest at 2/3 length; width: 285 µm, length/width ratio: 3.12. Sc ending slightly distal of FCu, R_{2+3} fading, poorly visible. RM slightly oblique relative to R. FCu placed well distally of RM; VR_{Cu} 1.38. Veins ending as follows (in order from base to tip): An, Sc, Cu_1, R_1, R_{4+5} and M_{3+4}, M_{1+2}. Wing covered with dense macrotrichia in distal half at least.

Legs. Tibial apices including combs of mid and hind legs weakly visible. Spurs not observed on forelegs. Only one spur visible on mid leg (c. 20 µm long) and hind leg (c. 28 µm long). Sensilla chaetica on ta_1 of p_2 not observed. Lengths of leg segments and leg ratios in Table 1.

TABLE 1. Leg segment lengths (µm) and leg ratios of male *Stempellinella electra* **sp. nov.**

	fe	ti	ta_1	ta_2	ta_3	ta_4	ta_5	LR
p_1	430	235	500	275	210	140	65	2.13
p_2	485	365	240	115	85	65	45	0.66
p_3	?	415	295	165	150	90	50	0.71

Hypopygium (Fig. 4A–D). Gonostylus c. 50 µm long, shorter than gonocoxite, broadest at mid-length, tapering to blunt apex armed with strong apical setae. Anal tergite subtriangular, with several median setae and at least 7 posterolateral setae on each side of anal point (poorly visible on photographs). Anal point broad at base, distinctly narrowed distally, with slender distal section and strong crests tapering towards anal point tip. Superior volsella elongated, with broadened round apex, bearing 2 setae on median margin. Digitus absent. Stem of median volsella club-shaped, slightly broadened apically, c. 20 µm long, with several setiform and 4–5 wide pectinate and foliate lamellae (Fig. 4A, B, D). Inferior volsella reaching 2/3 length of gonostylus at most, somewhat arcuate, tapering to pointed posteromedially directed apex, with several strong setae including 2 stout setae on apex (Fig. 4A–C).

Remarks. *Stempellinella electra* is the third fossil species of the genus found in Eocene amber, along with *S. bicorna* Seredszus *et* Wichard, 2007 and *S. ivanovae* Giłka *et* Zakrzewska, 2014 (Seredszus & Wichard 2007, Zakrzewska & Giłka 2014). The new species fits well the emended generic diagnosis for *Stempellinella* Brundin, 1947 (Ekrem 2007)—the adult male has bare ovoid and broadly separated eyes (Fig. 3C), the wing vein R_{4+5} ending opposite to M_{3+4} (Fig. 3F), the broadened superior volsella, and the gonostylus shorter than the gonocoxite (Fig. 4). Significant differences in the hypopygium structure have been observed between the three fossil *Stempellinella* species. *S. electra* is distinct in having a long anal point, broad at base and narrowed distally (in contrast to the short anal point in *S. bicorna*) bearing strong anal point crests (Fig. 4B, C)—not observed in the two fossil relatives, but resembling those known from several extant species (*cf*. Ekrem 2007). The best diagnostic characters for *S. electra* is the superior volsella elongated and broadened apically, the inferior volsella arcuate and pointed, and the median volsella bearing several setiform and 4–5 wide pectinate and foliate lamellae (Fig. 4A, B, D)—the combination of shapes not recorded neither in fossil or extant *Stempellinella* (the pectinate lamellae are known only from *S. reissi* Casas *et* Vilchez-Quero, 1991).

It is worth noting that we observed a tendency to formation of a fully-segmented antennal flagellum in *Stempellinella electra*, similar to that known from *S. ivanovae*. However, when comparing this character in these two species, the higher number of incompletely fused flagellomeres may indicate more advanced state in *S. electra* (flagellomeres 11–13 fused in part, Fig. 3D, E) than that plesiomorphic state known from *S. ivanovae* (only flagellomeres 12 and 13 fused in part; Zakrzewska & Giłka 2014: fig. 3C).

Stempellinella ivanovae Giłka *et* Zakrzewska, 2014

Stempellinella ivanovae Giłka *et* Zakrzewska, 2014: Zakrzewska & Giłka 2014: 338 (adult male; Eocene Baltic amber, Rovno).

Material examined. Adult male (tarsi of left legs separated or not visible) preserved in 50 x 20 x 12 mm piece of amber (Eocene, ~45–40 Ma, Baltic amber, Gulf of Gdańsk; MAI-1140); animal syninclusions: Diptera (numerous ind.): Chironomidae, Ceratopogonidae, Psychodidae, Empididae + Thysanoptera (1 ind.).

Remarks. The structure of the hypopygial anal point, the presence of the short nipple-like process on the gonostylus, the wing venation pattern (except the presence of a thin and semitransparent vein R_{2+3}) are the characters found in the presently examined individual, which indicate the recently described species—*Stempellinella ivanovae*. Unfortunately, the remaining diagnostic structures are too weakly observable to complement description of the species (see Zakrzewska & Giłka 2014).

The total number of all known *Stempellinella* increases now to 22 (see the list below), including the three fossil and 18 extant species listed by Ekrem (2007) + 1 species presently proposed to be transferred from the genus *Stempellina* Thienemann *et* Bause, 1913. *S. sofiae*, known from adult male (Fusari & Lamas 2014), fits the generic diagnosis of *Stempellinella*, including several crucial characters discussed above (e.g. gonostylus distinctly shorter than gonocoxite; superior volsella rounded, extensive), thus is listed in a new combination.

A list of species of the genus *Stempellinella* Brundin, 1947

Stempellinella apicula Guo *et* Wang, 2005 (extant, China Yunnan)
Stempellinella bicorna Seredszus *et* Wichard, 2007 (fossil, Eocene Baltic amber)
Stempellinella boltoni Ekrem, 2007 (extant, U.S. Ohio)
Stempellinella brevilamellae Guo *et* Wang, 2005 (extant, China Sichuan)

Stempellinella brevis (Edwards, 1929) (extant, West Palaearctic)
Stempellinella chambiensis (Goetghebuer, 1935) (extant, widespread)
Stempellinella ciliaris (Goetghebuer, 1935) (extant, Europe)
Stempellinella coronata Inoue, Kawai *et* Imabayashi, 2004 (extant, Japan)
Stempellinella distincta Ekrem, 2007 (extant, U.S. Wyoming, Oregon)
Stempellinella edwardsi Spies *et* Sæther, 2004 (extant, Holarctic)
Stempellinella electra Giłka *et* Zakrzewska, **sp. nov.** (fossil, Eocene Baltic amber)
Stempellinella fimbriata Ekrem, 2007 (extant, North America)
Stempellinella flavidula (Edwards, 1929) (extant, Europe)
Stempellinella ivanovae Giłka *et* Zakrzewska, 1914 (fossil, Eocene Baltic amber)
Stempellinella lamellata Ekrem, 2007 (extant, Brazil, Bolivia)
Stempellinella leptocelloides (Webb, 1969) (extant, North America)
Stempellinella reissi Casas *et* Vilchez-Quero, 1991 (extant, West Europe)
Stempellinella saltuum (Goetghebuer, 1921) (extant, Europe)
Stempellinella sofiae (Fusari *et* Lamas, 2014), **comb. nov.** (extant, Brazil)
Stempellinella sublettorum Ekrem, 2007 (extant, Canada New Brunswick)
Stempellinella tamaseptima (Sasa, 1980) (extant, Japan, Russian Far East, Canada British Columbia)
Stempellinella truncata (Freeman, 1958) (extant, South Africa)

Genus: *Tanytarsus* van der Wulp, 1874

Tanytarsus fereci Giłka, 2011

Tanytarsus fereci Giłka, 2011: 63 (male; Eocene Baltic amber, Gulf of Gdańsk).

Material examined. Holotype (MAI-4356) (see Giłka 2011a).

Tanytarsus glaesarius Giłka *et* Zakrzewska, sp. nov.

Type material. Holotype. Adult male (tarsi of left fore and hind leg missing, tarsi of mid legs broken and separated) preserved in 21 x 13 x 1 mm piece of amber (Eocene, ~45–40 Ma, Baltic amber, Gulf of Gdańsk; MAI-415a; Fig. 5A); animal syninclusions: Ceratopogonidae, Formicidae, Mordellidae, Thysanoptera, Psocoptera (all as single ind., MAI-415).

Derivatio nominis. Adjective derived from the Latin noun '*glaesum*', amber.

Diagnosis. Frontal tubercles stout, cylindrical. Antenna with flagellomeres 10–11 fused in part and 12–13 completely fused. Wing vein FCu placed far distally of RM (VR_{Cu} 1.52). Anal point wide at base, distinctly narrowed subapically, tapering to pointed apex. Superior volsella with 2 setae on apex. Digitus long, extending beyond superior volsella, curved, with blunt apex. Stem of median volsella bulbous, with slender foliate lamellae.

Description. Adult male (n = 1)

Total length c. 1.2 mm; wing length c. 820 µm.

Head (Fig. 5C–E). Eyes bare, reniform, with dorsomedian extensions (Fig. 5C). Frontal tubercles stout, cylindrical with blunt apices, c.15-20 µm long (Fig. 5D). Antennal flagellum composed of 11 segments of which 10 are well discernible, flagellomeres 10–11 fused in part (borders between remaining flagellomeres not visible, but distribution of setal tubercles indicates 13 segments), AR 0.82 (when flagellum measured as 10-segmented), AR 0.65 (as 11-segmented); plume fully developed (setae separated, but setal tubercles well developed) (Fig. 5E). Length of palpomeres 2–5 (µm): c. 30, 60, 76, 129. At least 15 clypeals.

Thorax. Ac and Dc not visible (thorax damaged in dorsal part), Pa 3 on each side, Scts 6 at least.

Wing (Fig. 5F). Slender, with anal lobe weak, broadest at 2/3 length, width: 260 µm, length/width ratio 3.15. FCu placed far distally of RM; VR_{Cu} 1.52. Veins ending as in most extant Tanytarsus (from base to tip): An, Sc, Cu_1, R_1, R_{2+3}, M_{3+4}, R_{4+5}, M_{1+2}; distances between ends of R_1–R_{2+3} and R_{2+3}–R_{4+5} unequal (VR_C c. 2.15). Almost whole wing (except base) covered with dense macrotrichia.

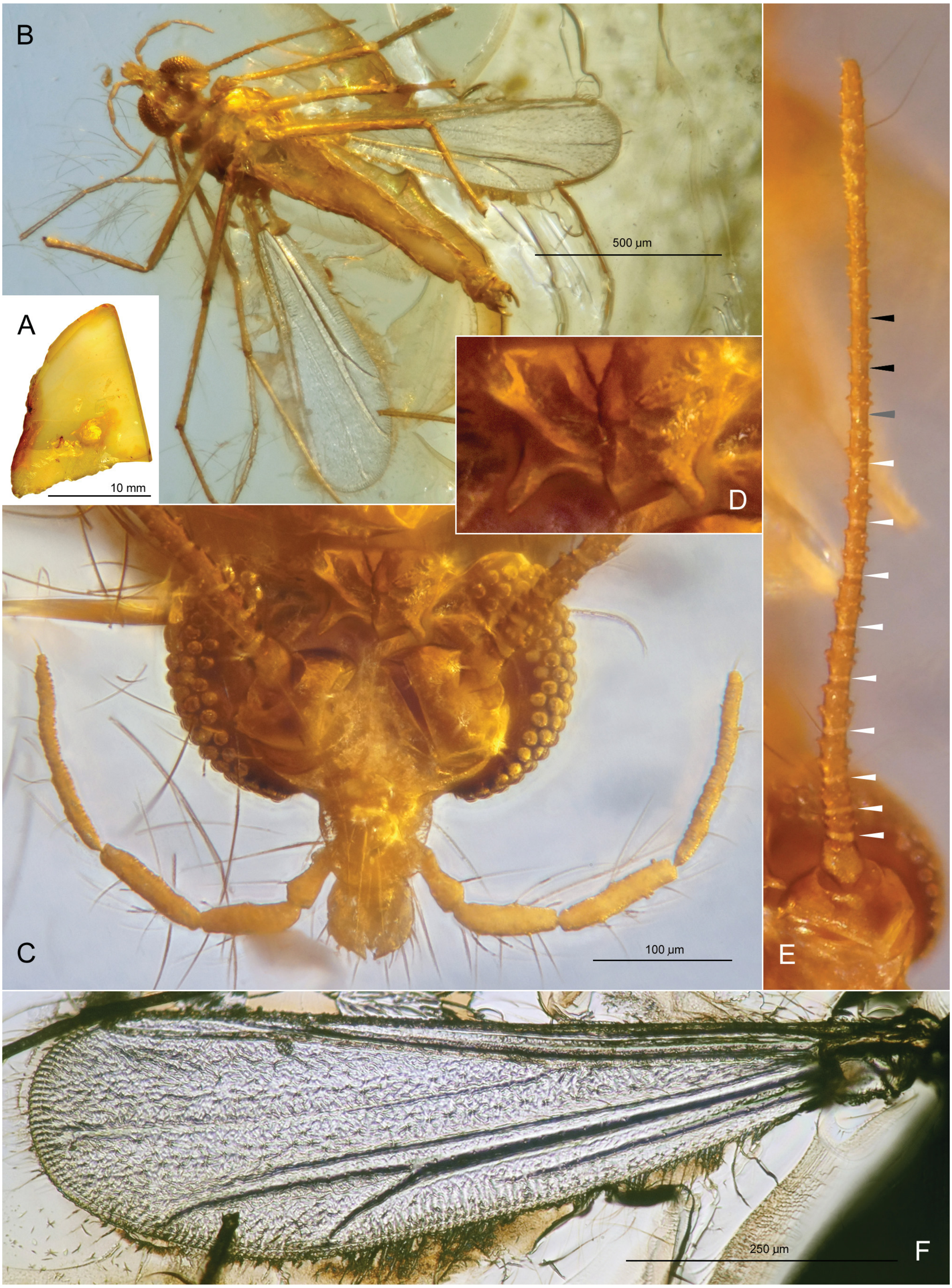

FIGURE 5. *Tanytarsus glaesarius* **sp. nov.**, adult male, holotype MAI-415a (Eocene, ~45–40 Ma; Baltic amber, Gulf of Gdańsk). **A**—inclusion; **B**—habitus; **C**—head; **D**—frontal tubercles, **E**—antenna photographed in reflected light (white arrows: borders between well discernible flagellomeres; grey arrow: incomplete fusion; black arrows: complete fusion); **F**—wing photographed in transmitted light.

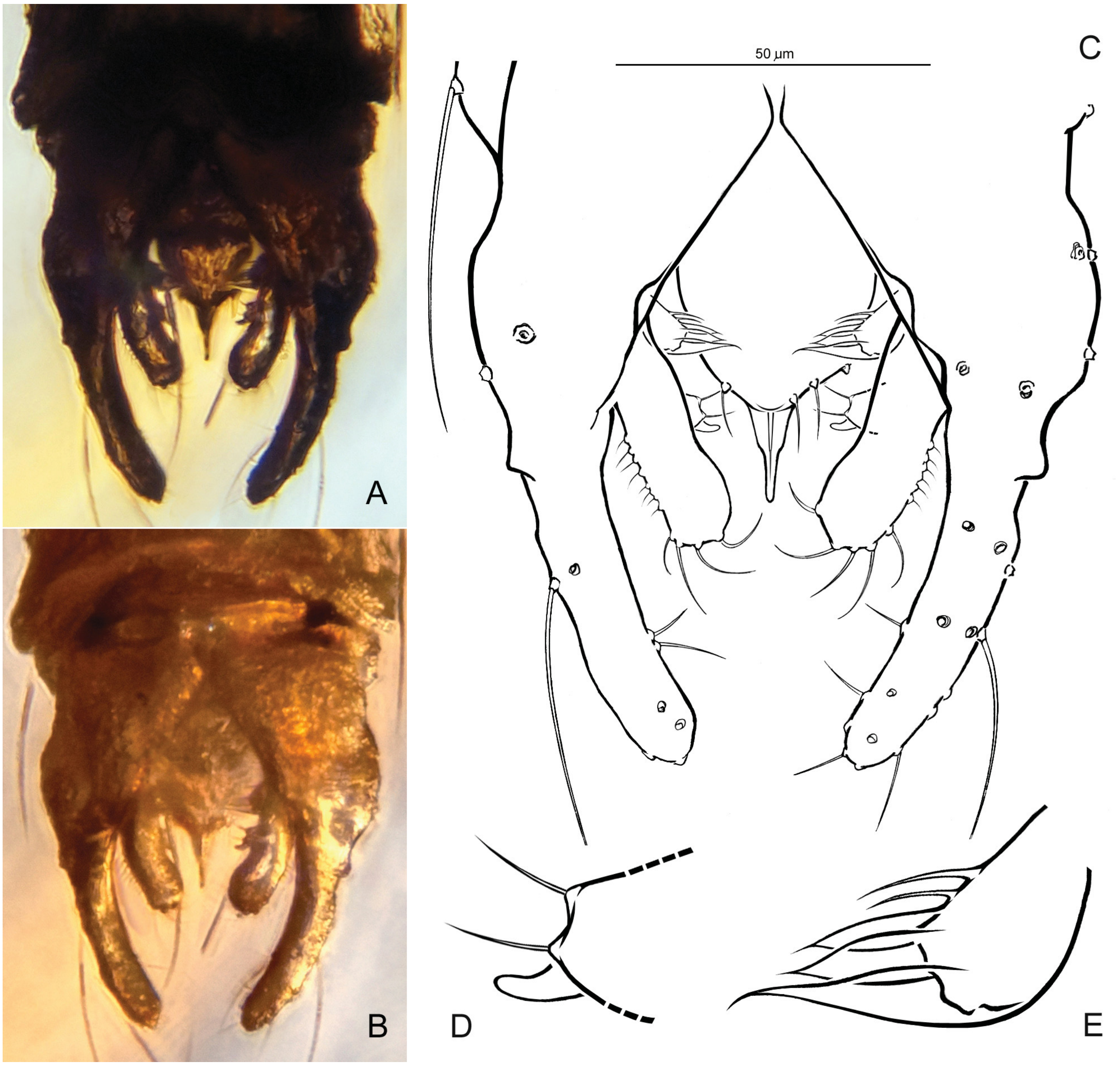

FIGURE 6. *Tanytarsus glaesarius* **sp. nov.**, adult male, holotype MAI-415a (Eocene, ~45–40 Ma; Baltic amber, Gulf of Gdańsk). **A**–**C**—hypopygium, ventral aspect, photographed in transmitted light (**A**), reflected light (**B**), and drawn (**C**); **D**—superior volsella and digitus, **E**—median volsella; (D, E—magnified c. 3 times relative to hypopygium drawn).

Legs. Tibia of fore leg without spur. Tibial combs of mid and hind legs separated, fan-shaped, teeth up to 16 µm long; each comb with slender spur, 26 µm long (mid leg) and 20–32 µm long (hind leg). Sensilla chaetica on ta_1 of p_2 not observed. Lengths of leg segments and leg ratios in Table 2.

TABLE 2. Leg segment lengths (µm) and leg ratios of male *Tanytarsus glaesarius* **sp. nov.**

	fe	ti	ta_1	ta_2	ta_3	ta_4	ta_5	LR
p_1	415	235	440	250	195	135	60	1.87
p_2	410	320	230	90	80	60	45	0.72
p_3	440	375	265	140	130	90	50	0.71

Hypopygium (Fig. 6A–E). Gonostylus stout, slightly arcuate, c. 50 µm (as long as gonocoxite), with sparse setae placed on median margin in distal half. At least 2-3 tubercles bearing posterolateral setae on each side of anal point. Anal point wide at base, distinctly narrowed subapically, tapering to pointed apex; spinulae or crests unobservable from ventral side. Superior volsella (visible only in distal part) with 2 setae on apex; digitus long, extending beyond superior volsella, curved, with blunt apex (Fig. 6D). Stem of median volsella bulbous, c. 15 µm long, with 3 slender foliate lamellae (Fig. 6E). Inferior volsella reaching half length of gonostylus, stout, with slightly swollen apical half posteromedially directed, armed with several curved setae on apex and strong setiform microtrichia on posterolateral margin (Fig. 6A–C).

Remarks. A set of characters given in the diagnosis and description (except the number of antennal flagellomeres, see remarks below), indicate that the new species belongs to the genus *Tanytarsus*. Several significant characters, i.e. the shape of the hypopygial superior volsella (with 2 setae on apex), the digitus (long, extending far beyond superior volsella), and the median volsella (with stout bulbous stem and slender foliate lamellae) are known from species of different systematic groups, e.g. the *eminulus*- *mendax*- or *chinyensis* group (*cf.* Reiss & Fittkau 1971, Ekrem 2003, Giłka & Paasivirta 2009). However, these characters form a combination unknown from any extant or fossil *Tanytarsus*, thus a group membership of *Tanytarsus glaesarius* remains open.
Tanytarsus glaesarius is the first Eocene species of this genus known from the adult male having the antenna with the reduced number of flagellomeres (Fig. 5E). This character is similar to that discussed above (see remarks on *Stempellinella electra*), but we propose to weigh it differently on a background of all known *Tanytarsus*, including extant species of this genus (males with 13 flagellomeres). Since we have not observed other characters that might suggest non-typical structure (e.g. deformations, asymmetry, brachyptery or other associated features known from non-flying chironomids; *cf.* Giłka 2011b, Giłka *et al*. 2013a), we assume that the reduced number of flagellomeres observed in *T. glaesarius* should be treated as a species-specific feature rather than a character which might be considered in the context of phylogenetic trends.

Tanytarsus protogregarius Giłka *et* Zakrzewska, sp. nov.

Type material. Holotype. Adult male (tarsi of hind legs broken and separated) preserved in 15 x 13 x 5 mm piece of amber (Eocene, ~45–40 Ma, Baltic amber, Gulf of Gdańsk; MAI-4325a; Fig. 7A); animal syninclusion: Sciaridae (1 ind., MAI-4325). Paratypes. Two adult males (tarsi of all legs broken and separated and/or missing, wings poorly preserved), as syninclusions, slightly compressed, preserved in 16 x 18 x 4 mm piece of clarified amber (MAI-4352, same data as holotype; Fig. 7B).

Derivatio nominis. Combination of two words: ‘*protoplastus*’ and ‘*gregarius*’. The species is the oldest known representative of the *Tanytarsus gregarius* species group.

Diagnosis. Femur of mid leg longer than femur of hind leg. Gonostylus with subapical tooth-like process. Anal point slender, tapering to blunt apex, bearing spinulae arranged in row. Superior volsella posteriorly directed, with nipple-like extension on apex and 4 strong medially directed setae on median margin. Digitus not observed. Stem of median volsella long, straight, with 5–6 slender foliate lamellae.

Description. Adult male (n = 1–3)

Total length 2.6–3.1 mm; wing length 1475–1575 µm.

Head (Fig. 7D, E). Eyes bare, with well developed dorsomedian extensions. Frontal tubercles not observed. Antenna with 13 well discernible flagellomeres, AR 0.92–0.97, plume fully developed (Fig. 7E). Length of palpomeres 2–5 (µm): 40–48, 113–137, 115–125, 149–185. Clypeals present but poorly visible (at least 4–6 in paratype specimens).

Thorax. Ac at least 12, Dc 13 on each side, Pa 3 on each side, Scts 12–13.

Wing (Fig. 7F, G). Ellipse-shaped, with anal lobe weak, broadest at 2/3 length, width: 385–395 µm, length/width ratio 3.83–3.98. FCu placed well distally of RM; VR_{Cu} 1.33. Veins ending as in most extant *Tanytarsus* (from base to tip): An, Sc, Cu_1, R_1, R_{2+3}, M_{3+4}, R_{4+5}, M_{1+2}; distances between ends of R_1–R_{2+3} and R_{2+3}–R_{4+5} unequal (VR_C 1.35). Almost whole wing (except base) covered with dense macrotrichia.

Legs. Tibia of fore leg with single, 28–30 µm long spur (a vestigial comb composed of 2–3 teeth, observed on one leg of paratype specimen is recognized as artefact). Tibial combs of mid and hind legs separated, fan-shaped, teeth up to 20 µm long (mid leg) and c. 20–24 µm long (hind leg); each comb with slender spur, up to 30 µm long (mid leg) and 36–48 µm long (hind leg). Sensilla chaetica on ta_1 of p_2 not observed. Lengths of leg segments and leg ratios in Table 3.

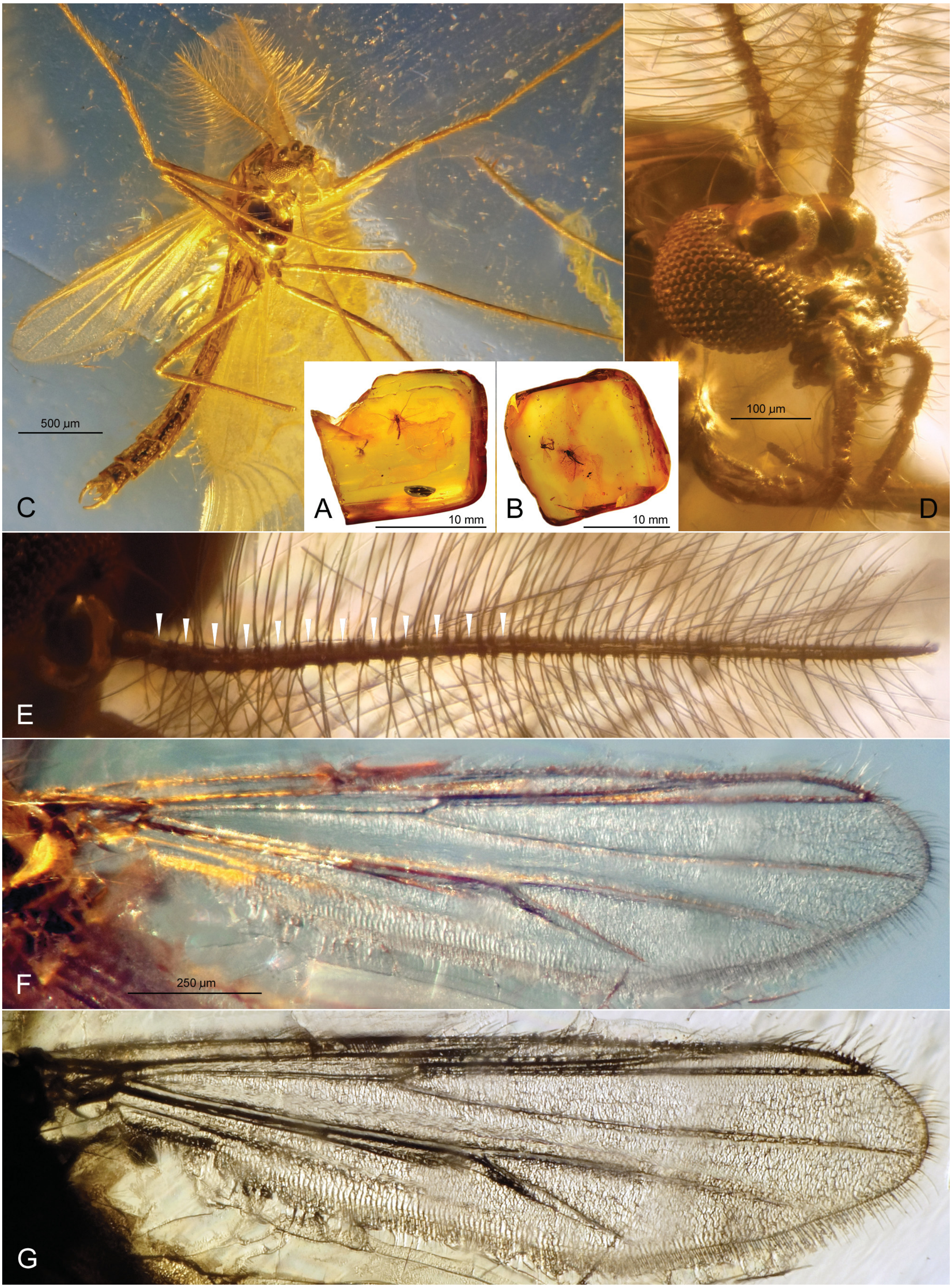

FIGURE 7. *Tanytarsus protogregarius* **sp. nov.**, adult male, holotype MAI-4325a (**A**, **C**–**G**), paratypes MAI-4352 (**B**) (Eocene, ~45–40 Ma; Baltic amber, Gulf of Gdańsk). **A**, **B**—inclusions; **C**—habitus; **D**—head; **E**—antenna (arrows: borders between flagellomeres); **F**, **G**—wing photographed in reflected (**F**) and transmitted light (**G**).

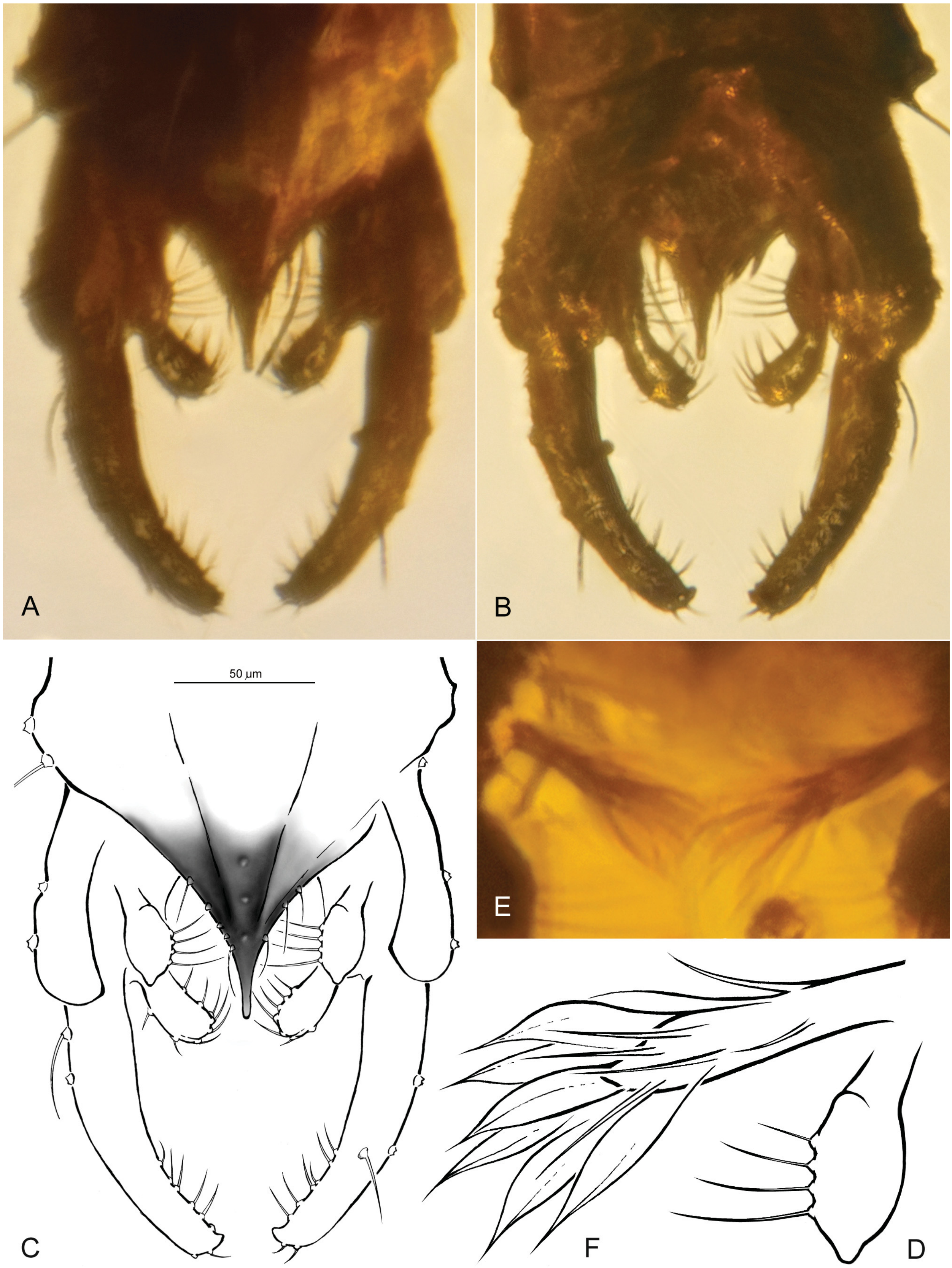

FIGURE 8. *Tanytarsus protogregarius* **sp. nov.**, adult male, holotype MAI-4325a (**A**–**D**), paratype MAI–4352 (**E**, **F**) (Eocene, ~45–40 Ma; Baltic amber, Gulf of Gdańsk). Hypopygium in dorsal (**A**, **C**) and ventral aspect (**B**); photographed in reflected light (**A**, **B**), and drawn (**C**); **D**—superior volsella; **E**, **F**—median volsella photographed in transmitted light (**E**) and drawn (**F**) (D—magnified c. 2 times and F—c. 5 times relative to hypopygium drawn).

TABLE 3. Leg segment lengths (μm) and leg ratios of male *Tanytarsus protogregarius* **sp. nov.**

	fe	ti	ta_1	ta_2	ta_3	ta_4	ta_5	LR
p_1	850	560	715–765	445–470	355–380	250–270	110–120	1.28–1.37
p_2	835	715–730	390–415	250–260	185–195	125	80–85	0.55–0.58
p_3	810	835–945	470	310	270–275	155–165	95	0.56

Hypopygium (Fig. 8A–F). Gonostylus stout, slightly curved at mid length, c. 95–115 μm, longer than gonocoxite, bearing several setae placed at median margin of distal half, with subapical anteromedially directed tooth-like process. Median setae on anal tergite not observed, at least 3 posterolateral setae on each side of anal point. Anal point slender, tapering to blunt apex, bearing at least 3 spinulae arranged in row, crests tapering towards anal point apex. Superior volsella posteriorly directed, oval, slightly elongated, with nipple-like extension on apex and 4 strong medially directed setae placed on distinct protuberances on median margin (Fig. 8D). Digitus not observed. Stem of median volsella c. 25 μm long, straight, bearing 5–6 slender foliate lamellae (Fig. 8E, F). Inferior volsella reaching 1/3 length of gonostylus at most, club-shaped, with posteromedially turned head-like apical part, armed with several stout curved setae.

Remarks. *Tanytarsus protogregarius* is here proposed to be included in the *gregarius* species group due to a distinct similarity to the extant species—*Tanytarsus gregarius* Kieffer, 1909. Both the species are similar in the shape of the anal point and the superior volsella that is posteriorly directed and armed with nipple-like apical extension (*cf.* Fig. 8 and Reiss & Fittkau 1971, fig. 26). The best characters separating the new species from other members of the group is the subapical tooth-like process of the gonostylus and the presence of four strong medially directed setae on median margin of the superior volsella (three strong setae are known from extant species). Moreover, in the adult male of *T. protogregarius* we observed interesting proportions of leg segments. In all examined individuals femora of mid legs are longer than those of hind legs (Table 3). Similar proportions we found in other fossil species—*Tanytarsus congregabilis* Giłka *et* Zakrzewska, 2013 of the *lugens* group. It may indicate close relations between the two groups, which were previously proposed also to be treated as one—the concept based on adult male morphological characters of extant species (Giłka 2000). The latter character discussed, however, is not known from any extant European species of these two groups [*T. gregarius*, *T. aberrans* Lindeberg, 1970, *T. inaequalis* Goetghebuer, 1921, and *T. lugens* (Kieffer, 1916), *T. bathophilus* Kieffer, 1911, *T. latiforceps* Edwards, 1941, *T. trux* Giłka *et* Paasivirta, 2007; all examined], in which femora of mid legs are typically shorter than those of hind legs.

Tanytarsus serafini Giłka, 2010

Tanytarsus serafini Giłka, 2010: 715 (male; Eocene Baltic amber, Gulf of Gdańsk); Giłka *et al.* 2013b: 583 (male; Eocene Baltic amber, Rovno).

Material examined. Holotype (MAI-5157a), paratype (MAI-5157b) (see Giłka 2010). Additional specimens: 1 male (tarsus of right hind leg missing) preserved in 35 x 28 x 18 mm piece of amber (Eocene, ~45–40 Ma, Baltic amber, Gulf of Gdańsk; MAI-275); animal syninclusion: Aphidoidea (1 ind.); 1 male preserved in 22 x 13 x 4 mm piece of amber (Eocene, ~45–40 Ma, Baltic amber, Gulf of Gdańsk; MAI-5184), animal syninclusions: Formicidae (1 ind.), Acari (1 ind.).

Acknowledgements

We thank the Head of the Museum, Ryszard Szadziewski, for placing the material at our disposal, and Elżbieta Sontag (MAI) for technical help in handling the inclusions. The first author's project was financially supported ('Young Researcher', grant no. 538-L114-B604-14, University of Gdańsk).

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