

First Phantom Crane Flies (Diptera, Ptychopteridae) from Baltic Amber (Eocene)

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ABSTRACT.— First fossil species of phantom flies (Diptera, Ptychopteridae) is described from Baltic amber (Eocene). Its affinities to recent *Ptychoptera* Meigen, 1803 are discussed.

SPECIES NOVA: *Ptychoptera (Ptychoptera) eocenica* n. sp.

INTRODUCTION

No fossil species of phantom flies (Diptera, Ptychopteridae) were known from fossil resins so far (Evenhuis, 1994). The family covers about 60 recent species, 25 of them known from Palaeartic region. 23 Palaeartic species belong to genus *Ptychoptera* Meigen, 1803 (Krzeminski & Zwick, 1993). Family, as well as genus *Ptychoptera* is distributed throughout the world except the Australasian and the Neotropical regions (Alexander, 1981). The larvae are aquatic or semi-aquatic, developing in saturated mud or silt at the margins of streams, lakes or ponds.

Only five fossil species of phantom flies are described and only one unidentified species among them belongs to genus *Ptychoptera*. None of them are described from fossil resins (Evenhuis, 1994).

From the newly obtained Baltic amber inclusions by the author, two of them occurred to belong to still unknown from fossil resins family of phantom crane flies Ptychopteridae. Both specimens are males with well preserved genitalia, and both belong to the same species. Holotype was sent to the collection of fossils of the Academy of Natural Sciences, Philadelphia PA, USA and paratype to the Muséum d'Histoire Naturelle, Neuchâtel, Switzerland.

MATERIALS AND METHODS

Amber pieces were grinded and polished to reveal taxonomic details of the preserved specimens. Before grinding pieces were covered with small amount of fast drying glue to prevent them from cracking (especially paratype). Later glue mostly was removed during grinding and polishing. Phantom crane flies were studied with a Motic SMZ168TL dissecting microscope. Drawings were completed by author from photographs which were made using digital camera Canon EOS D30 mounted on dissecting microscope.

Amber fossils belonging to the following collections were studied: Academy of Natural Sciences, Philadelphia

PA, USA (number of specimen starting with "ANSP") and Muséum d'Histoire Naturelle, Neuchâtel, Switzerland (number of specimen starting with "MHNN"). Types of new species are deposited in these collections.

Terminology of morphological features generally follows that of Andersson (1997) and Zitek-Zwyrtek (1971).

SYSTEMATICS

Order DIPTERA

Family PTYCHOPTERIDAE

Subfamily PTYCHOPTERINAE

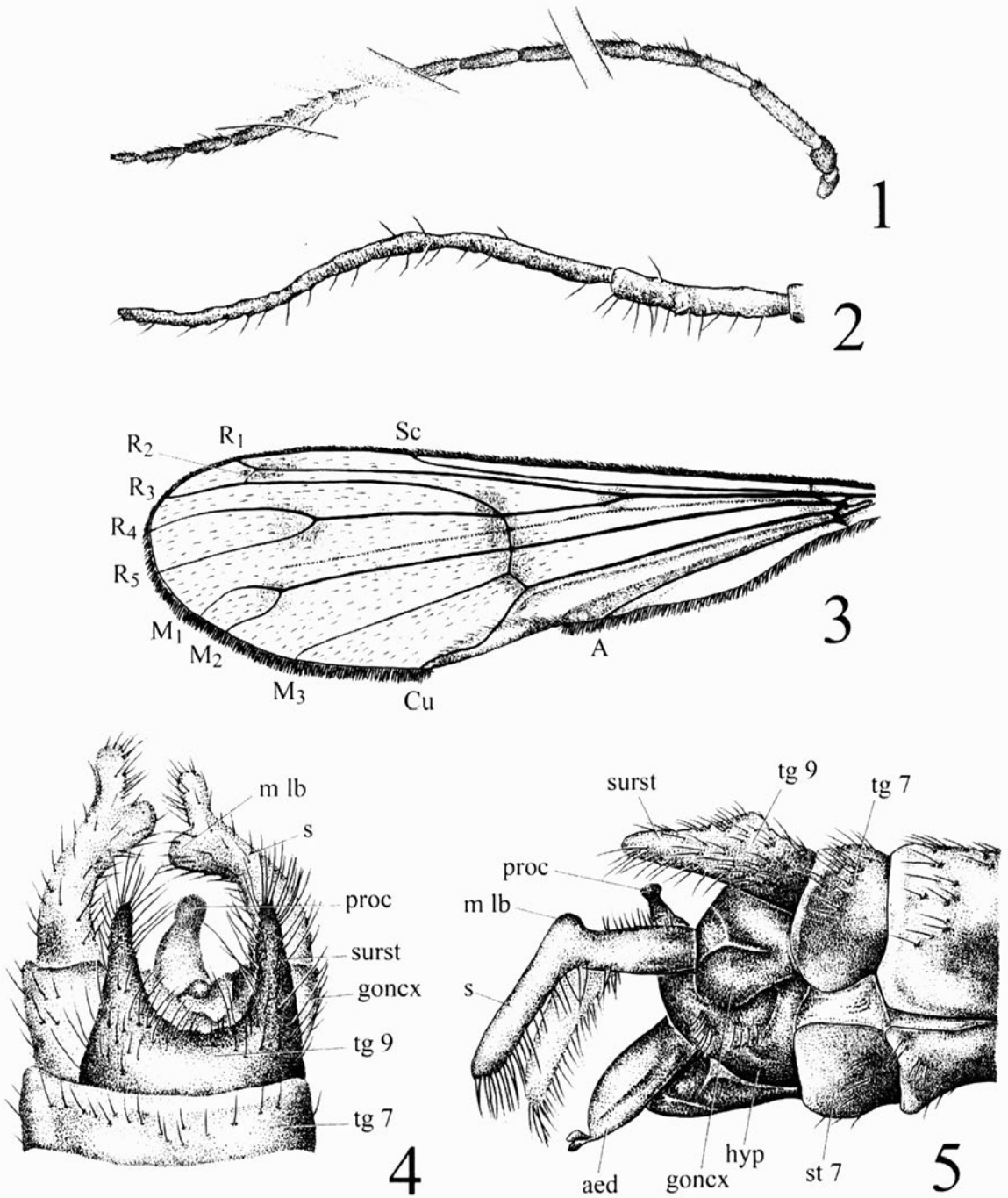
Ptychoptera (Ptychoptera) eocenica n. sp.

Figs. 1-6

Material Examined.— HOLOTYPE, Sembian Peninsula, Kaliningrad Region, Russia, Baltic amber, Eocene, male, ANSP 80344 (Fig. 6). PARATYPE, same as holotype, male, MHNN 1880.

Diagnosis.— Comparatively small phantom fly, body length 7.7-7.8 mm, wing length 6.7-7.0 mm. Wing transparent with darkened areas: spot at the base of wing surrounding basal cross-veins, small spot at the base of *Rs*, wide belt on the cord, stigma, bigger spots surrounding bases of cells *r4* and *m1*, and very small spots at the middle of veins *R4+5* and *M1+2*. Vein *Rs* long, four times as long as *r-m*; vein *R2+3+4+5* missing. Male genitalia (Figs. 4, 5): Surstylus simple, slightly narrowing toward apex. Stylus resembles ice-hockey stick with both ends approximately equal. Small bump or lobe presents at the opposite side of bending point. Proctiger straight, up-turned, with widened oval apex. Aedeagus comparatively big, straight, bifid at apex.

Male (Fig. 6). Body brown, 7.7-7.8 mm long. Head small, broader than long, closely applied to thorax. Compound eyes relatively large, semispherical. Frons rather broad, with mate black posterior portion and shining silver anterior portion. Frons right behind eyes slightly light-



Figures 1-5. *Ptychoptera eocenica* n. sp.: 1 – right antenna, holotype, 2 – two apical segments of right palpus, paratype, 3 – right wing, holotype, 4 – male genitalia, dorsal view, holotype, 5 – male genitalia, lateral view, paratype; aed – aedeagus, goncx – gonocoxite, hyp – hypandrium, m lb – median lobe, proc – proctiger, s – stylus, st – sternite, surst – surstylus, tg – tergite.



Figure 6. General view of *Ptychoptera cocenica* n. sp., holotype.

ened, brownish. Antenna (Fig. 1) filiform, 3.5-3.6 mm long, if bent backwards, reaching basal third of second abdominal tergite, 15-segmented with indication of very reduced terminal 14th flagellomere. Pedicel cylindrical, brown with slightly darkened apex, just slightly longer than wider, scape short, rounded, brown, with slightly darkened distal portion, flagellomeres nearly cylindrical with very slightly widened basal third. First flagellomere brown with slightly darkened apex; second flagellomere with brown basal portion (approximately two-thirds of segment's length) and dark brown distal portion (about one third of segment's length); third flagellomere with basal half brown and distal half dark brown; fourth flagellomere with brown base, the rest part dark brown; fifth flagellomere with very slightly lightened base, the rest part dark brown; all distal segments, starting from sixth dark brown. 13th flagellomere small, 0.1 mm long, twice as short as preceding segment. Setae on flagellomeres are dark and shorter than respective segments (they are approximately four fifths of segments length). All flagellomeres are also covered with short, light, and dense pubescence. Palpus (Fig. 2) five-segmented, 2.5 mm long, filiform, light brown. Basal or first segment very short, cup-

shaped, wider at apex; length twice exceeds widest apical part. Second segment approximately twice as long as basal. Third segment slightly longer than both basal segments taken together, fourth segment approximately as long as third. Last segment very long, slightly curved, with rugged surface, it is approximately 1.5 times as long as all preceding segments taken together. Palpus covered with scarce semi-erect hairs. Mouth labella wide, fleshy, with long erect hairs on ventral surface.

Thorax generally brown. Pronotum light-grayish-brown. Prescutum and scutum brown with irregular darker spots due to oxidation. Scutellum brown with lighter margins. Mediotergite brown dorsally with frontally yellowish sides. Dorsum of thorax covered with dense short hairs. Basal parts of them are erect, apices bend posteriorly. Hairs are most dense along median longitudinal line of prescutum. Hairs on other parts are less dense, mostly without bend apices, few hairs on mediotergite with frontally looking apices. Laterotergite rusty yellow ventrally and yellow dorsally. Pleura together with coxae uniformly grayish brown. Wing 6.7-7.0 mm long, transparent with darkened areas: spot at the base of wing surrounding basal cross-veins, small

spot at the base of *Rs*, wide belt on the cord, stigma, bigger spots surrounding bases of cells *r4* and *m1*, and very small spots at the middle of veins *R4+5* and *M1+2*. Costa brown, other veins light brown. Venation usual for the genus: vein *Sc1* ending approximately at the level of the middle of *R4+5*; *R2* slightly shorter than *R1*; *Rs* long (like in *Ptychoptera contaminata*), four times as long as *r-m*; apex of *Rs*, bases of *R3* and *R4+5* and *r-m* have point contact, thus common stem of *R2-R5* not expressed; cell *r4* approximately as long as its stem; cell *m1* very short, just twice as long as wide; *r-m* and basal portion of *M3* at the same level; false vein *vena spuria* well expressed. Apical cells with abundant macrotrichiae, basal portion of wing nearly bare, without macrotrichiae. Veins covered with short, dark, semi-erect hairs, setae on costal vein stronger and black. Haltere 1.1 mm long, stem light brown, head with dark brown frontal part and lighter posterior part. Prehaltere light, grayish-brown. Femur and tibia brown with narrowly darkened apices. Femur covered with short setae; setae on tibia longer and denser. Tarsus uniformly dark brown with short setae. Tibial spurs long and strong. Femur I: 3.9 mm long, femur II: 4.2 mm, femur III: 4.2-4.5 mm, tibia I: 3.6-4.3 mm, tibia II: 4.0-4.2 mm, tibia III: 4.2-5.7 mm, tarsus I: 5.3 mm, tarsus II: 4.0-4.2 mm, tarsus III: 4.5-4.6 mm long.

Abdomen generally brown, covered with short, scarce, semi-erect hairs. First tergite yellowish brown throughout; second tergite long, light brown, with dark lateral spots at base and dark, transverse, apical stripe, which has slight median incision, posterior margin narrowly whitened; third tergite with light brown basal part and dark brown distal, posterior margin narrowly whitish; rest tergites (except fused eighth and ninth tergites) slightly lighter basally and dark posteriorly, with rather wide whitish posterior margins. Basal sternites light brown, distal sternites with light brown basal parts and widely darkened posterior margins. Third sternite simple, without rows of hairs.

Male genitalia (Figs. 4, 5): Fused eighth and ninth tergites together with surstyli entirely brown. Posterior margin of that structure looks like regular "U" letter, just very bottom of it very slightly wavy. Surstylus simple, slightly narrowing toward apex. Tip of surstylus rounded with long hairs. Stylus long and narrow, comparatively simple, light brown turning very light, whitish yellow towards apex with slightly darkened margins of median lobe. The shape of stylus resembles that of ice-hockey stick with both ends approximately equal. Small bump or lobe presents at the opposite side of bending point. Ventral surface of stylus covered with long whitish hairs. Length of these hairs slightly exceeds width of stylus. Gonocoxite simple nearly rounded. Surface of gonocoxite with slight grooves which possibly occurred due to reaction with resin. Hypandrium simple, rounded. Proctiger straight, up-turned with widened oval apex. Aedeagus comparatively big, straight, with bilobed

apex.

Female unknown.

Etymology.— The species is named after the age of the Baltic amber locality.

Discussion.— The new species belongs to subgenus *Ptychoptera* (*Ptychoptera*), because third abdominal sternite of male simple, not equipped with an auxiliary copulatory organ which is used as characteristic to subgenus *P.* (*Parapteroptera*) (Andersson, 1997). Wing venation and wing pattern resembles that of recent *P. contaminata* (Linnaeus, 1758), especially such features as very long and straight radial sector *Rs*, and absence of common stem of *R2-R5*. *P. eocenica* n. sp. has longer vein *R1+R2* reaching nearly middle level of cell *r4*, when that of *P. contaminata* reaches only level of *r4* base, also basal part of vein *M3* in *P. eocenica* n. sp. reaches *r-m* (like in *P. scutellaris* Meigen, 1818), when these veins are clearly separate in *P. contaminata*.

Male genitalia of new species are clearly different from all recent species. They are generally simpler. Eighth and ninth tergites together with surstyli are simple and resemble that of *P. lacustris* Meigen, 1830, but stylus is also rather simple, without complicated additional lobes which are characteristic to most recent species (Andersson, 1997; Krzeminski, 1986; Krzeminski & Zwick, 1993; Zitek-Zwyrtek, 1971).

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REFERENCES

- Alexander, Ch. P. 1981. Ptychopteridae. In: McAlpine, J. F., B. Peterson, G. Shewell, H. Teskey, J. Vockeroth and D. Wood. Manual of Nearctic Diptera. Vol. 1. Agriculture Canada Research Branch Monograph 27: 325-328.
- Andersson, H. 1997. Diptera Ptychopteridae, Phantom Crane Flies. In: Aquatic Insects of North Europe – A Taxonomic Handbook, Ed. Nilsson, A. N. Vol. 2: 193-207.
- Evenhuis, N. 1994. Catalogue of the fossil flies of the world (Insecta: Diptera). Bishop Museum Press and E. J. Brill, Leiden. 570 pp.
- Krzeminski, W. 1986. Ptychopteridae of Poland (Diptera, Nematocera). In: Polskie Pismo Entomologiczne. Vol. 56: 105-131.
- Krzeminski, W & P Zwick 1993. New and Little Known Ptychopteridae (Diptera) from Palaearctic Region. In: Aquatic Insects. Vol. 15, No. 2: 65-87.
- Zitek-Zwyrtek, K. 1971. Czechoslovak Species of the Family Ptychopteridae (Diptera). In: Acta ent. Bohemoslov., 68: 416-426.