



## Review of the genus *Paramanota* Tuomikoski (Diptera, Mycetophilidae), with the description of new fossil and recent species

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### Abstract

The genus *Paramanota* includes the following species: *P. awanensis* Hippa, Jaschhof & Vilkamaa (Peninsular Malaysia), *P. bifalx* sp. n. (Thailand), *P. furcillata* sp. n. (Thailand), *P. grandaeva* sp. n. (Baltic amber), *P. orientalis* Tuomikoski (Burma and Thailand), *P. paxillosa* sp. n. (Thailand), *P. peninsulae* Hippa, Jaschhof & Vilkamaa (Peninsular Malaysia), *P. schachtii* Papp, and *P. sumatrana* Hippa, Jaschhof & Vilkamaa (Sumatra). *P. orientalis* is redescribed. A key to the species is given. Generic characters of *Paramanota* are discussed.

**Key words:** Diptera, Mycetophilidae, Manotinae, *Paramanota*, new species, Thailand, fossils

### Introduction

*Paramanota* Tuomikoski (type species *P. orientalis* Tuomikoski) is usually placed within the Mycetophilidae subfamily Manotinae together with the three extant genera *Eumanota* Edwards (*E. leucura* Edwards), *Manota* Williston (*M. defecta* Williston) and *Promanota* Tuomikoski (*P. malaisei* Tuomikoski), and the Cretaceous genus *Alavamanota* Blagoderov & Arillo (*A. hispanica* Blagoderov & Arillo) (for further discussion, see Hippa *et al.*, 2004). The phylogenetic analysis by Hippa *et al.* (2004) places *Paramanota* as the sister group of *Eumanota*+*Promanota*.

Tuomikoski (1966) described *Paramanota* as monotypic and the type species *P. orientalis* Tuomikoski from Burma remained for a long time the only known species. Papp (2004) added *P. schachtii* from Taiwan and Hippa *et al.* (2004) added *P. awanensis* and *P. peninsulae* from Peninsular Malaysia and *P. sumatrana* from Sumatra. No new records of any of the species since their descriptions have been published.

Recently I have studied an extensive amount of material of Sciaroidea collected in the Thailand National Parks by the Thailand Inventory Group for Entomological Research (TIGER) (www.sharkeylab.org). In the thousands of checked Malaise trap samples only seven specimens of *Paramanota* were recorded, including the incompletely known type species and three undescribed ones. The aim of the present work is to describe and name the three new species, redescribe *P. orientalis*, discuss the other species and give a key to the species of *Paramanota*. I have recently studied the first fossil *Paramanota* and will use this opportunity to describe it in context with the extant species.

### Material and methods

The material was preserved in ethanol. Abdomens were detached from specimens and macerated in warm concentrated potassium hydroxide (KOH). The hypopygium was also detached beyond segment 8. After washing in water and stepwise dehydration in alcohol, the parts of the abdomen were placed for a few seconds in clove oil (eugenol), after which they were mounted in “Euparal” between two pieces of cover glass, enabling the specimen to be studied from both sides under a compound microscope. These preparations are attached to regular glass slides by a couple of strips of adhesive tape across their edges and thus easily detachable when needed. Other parts of the body were not treated with potassium hydroxide, but after dehydration mounted as they were in “Euparal”.

The morphological terminology is indicated in Figs 1 B and F, 2 C and D, 3 E, 4 B, and 5 C and D. The parameres and aedeagus are closely associated and the detailed structure of the complex is not clear. Where possible the terminology follows Sjøli (1997) and the most important characters in this paper are given in Figs 1–5.

The wing length was measured from humeral cross vein (h) to wing apex.

Illustrations of the recent species were made with the aid of a drawing tube attached to a Leitz Diaplan or Leitz Laborlux compound microscope; illustrations of the fossil species with a drawing tube attached to a Wild M5 stereomicroscope.

The material is deposited in Geoscience Centre of the University of Göttingen (Museum), Göttingen (GZG), Queen Sirikit Botanic Garden, Chiang Mai (QSBG) and The Swedish Museum of Natural History, Stockholm (SMNH).

## Notes on the characters of *Paramanota*

Papp (2004) mentioned that in *P. schachti* abdominal sternite 1 has a large V-shaped membranous medial area anteriorly. This character was ignored by Hippa *et al.* (2004). *P. awanensis*, *P. peninsulae* and *P. sumatrana* all show this character however, as well as all the new species described in the present paper. In all species of *Paramanota* sternite 1 is also unusually long, oblique, sloping postero-ventrad (Fig. 4 B).

In one of the paratypes of *P. furcillata* the basal parts of veins  $M_1$  and  $M_2$  and the whole length of stM are visible as a dark stripe (Fig. 1 F). The latter joins the basal part of M a short distance basal from the faint remnant of Rs. In this case there is no essential difference to some *Manota* in which the non-sclerotized basal part of M can be discerned by its setosity (Hippa 2009: fig. 1 e).

The row of setae dorsally in the middle of the anal lobe of wing probably indicates  $A_1$  rather than  $A_2$ . Its position is similar to  $A_1$  in *Manota*, which often have both  $A_1$  and  $A_2$  visible (e.g. Hippa 2009: fig. 1 e).

In all the described *Paramanota* the male gonocoxa has a large ventral lobe on each side and the sides are separated from each other by a membranous area. The ventral lobe is similar to sternite 9 in *Manota* (e.g. Hippa 2009: fig. 2 d) except for being completely medially divided into two halves. In many *Manota* sternite 9 is both antero- and postero-medially deeply incised (e.g. Hippa 2009: fig. 14 c) and in extreme cases almost completely divided into two halves (e.g. Hippa 2009: fig. 9 c). It is highly probable that the ventral gonocoxal lobe in *Paramanota* is actually sternite 9.

## The species of *Paramanota*

### Key to the species (males)

The unknown male of the fossil *P. grandaeva* **sp. n.** probably differs from all the recent species of the genus in the same way as the female: h and Sc are equally sclerotized to R1, not conspicuously weaker.

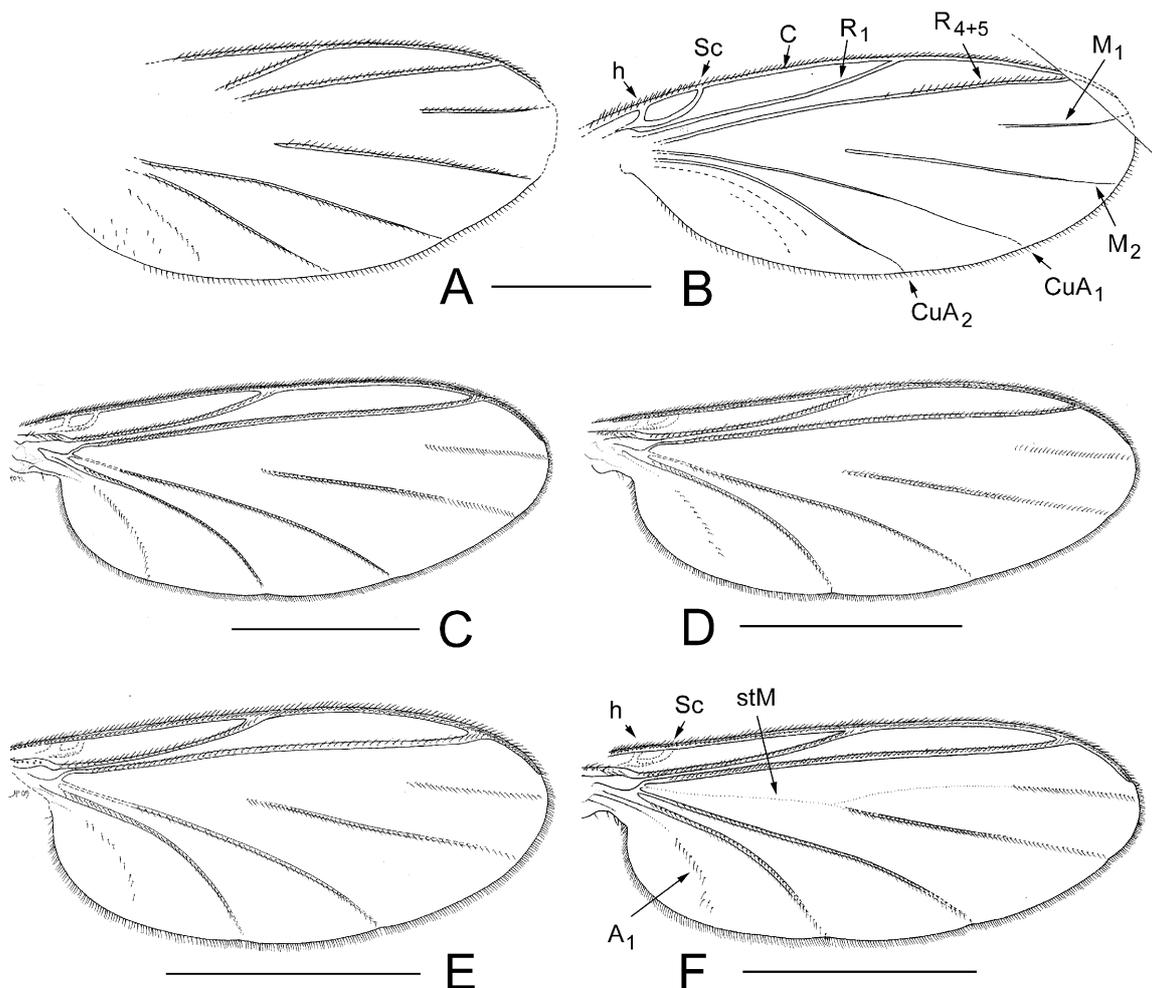
1. Ventral gonocoxal lobe simple, with rounded posterior margin (Figs 5 C, D) ..... *P. orientalis* Tuomikoski
- Ventral gonocoxal lobe posteriorly divided into two sub-lobes (Figs 2 C, D, 3 D, 6 B, C) ..... 2
2. Ventral gonocoxal lobe with the posterior sub-lobes broad, subequal in size (Papp 2004: figs 28, 29) .....  
..... *P. schachti* Papp
- Ventral gonocoxal lobe with the posterior sub-lobes unequal, either the more mesial or the more lateral one conspicuously narrower than the other one (Figs 2 C, D, 3 D, 6 B) ..... 3
3. Ventral gonocoxal lobe posteriorly divided into a narrow lateral and a broad mesial sub-lobe (Figs 2 C, D) ..... 4
- Ventral gonocoxal lobe posteriorly divided into a broad lateral and a narrow mesial sub-lobe (Fig. 3 D) ..... 6
4. The lateral sub-lobe shorter than broad, not prong- or thumb-like, the dorsal lobe of gonostylus in dorsal view elongate subtriangular, narrowing from base to apex (Figs 6 B) ..... *C. paxillosa* **sp. n.**
- The lateral sub-lobe longer than broad, prong- or thumb-like, the dorsal lobe of gonostylus in dorsal view short subtriangular, widening from base to apex (Figs 2 C, D, Hippa *et al.* 2004: fig. 9 a, b) ..... 5
5. The narrow lateral sub-lobe with only a few megasetae at apex (Figs 2 C, D) ..... *P. bifalx* **sp. n.**
- The narrow lateral sub-lobe with numerous megasetae at apex and along all its mesial side (Hippa *et al.* 2004: fig. 9

- a, b) ..... *P. peninsulae* Hippha, Jaschhof & Vilkkamaa
6. The narrow mesial sub-lobe and the posterior margin of the ventral gonocoxal lobe contiguous, very long, posteriorly extending as far as the gonostylus (Fig. 3 D) ..... *P. furcillata* sp. n.
- The narrow mesial sub-lobe arising from the dorsal side of the ventral gonocoxal lobe short, posteriorly extending to the middle of gonostylus (Hippha *et al.* 2004: fig. 10 a, b, fig. 11 a, b) ..... 7
7. Ventral gonocoxal lobe with a contiguous row of ca. 20 equal, short megasetae at the posterior margin, gonostylus with one comb-like aggregation of black lamellae on mesial side (Hippha *et al.* 2004: fig. 10 a, b) .....  
 ..... *P. awanensis* Hippha, Jaschhof & Vilkkamaa
- Ventral gonocoxal lobe with a widely interrupted row of 3 larger + ca. 10 smaller megasetae along the posterior margin, gonostylus with two groups of black lamellae on the mesial side (Hippha *et al.* 2004: fig. 11 a, b) .....  
 ..... *P. sumatrana* Hippha, Jaschhof & Vilkkamaa

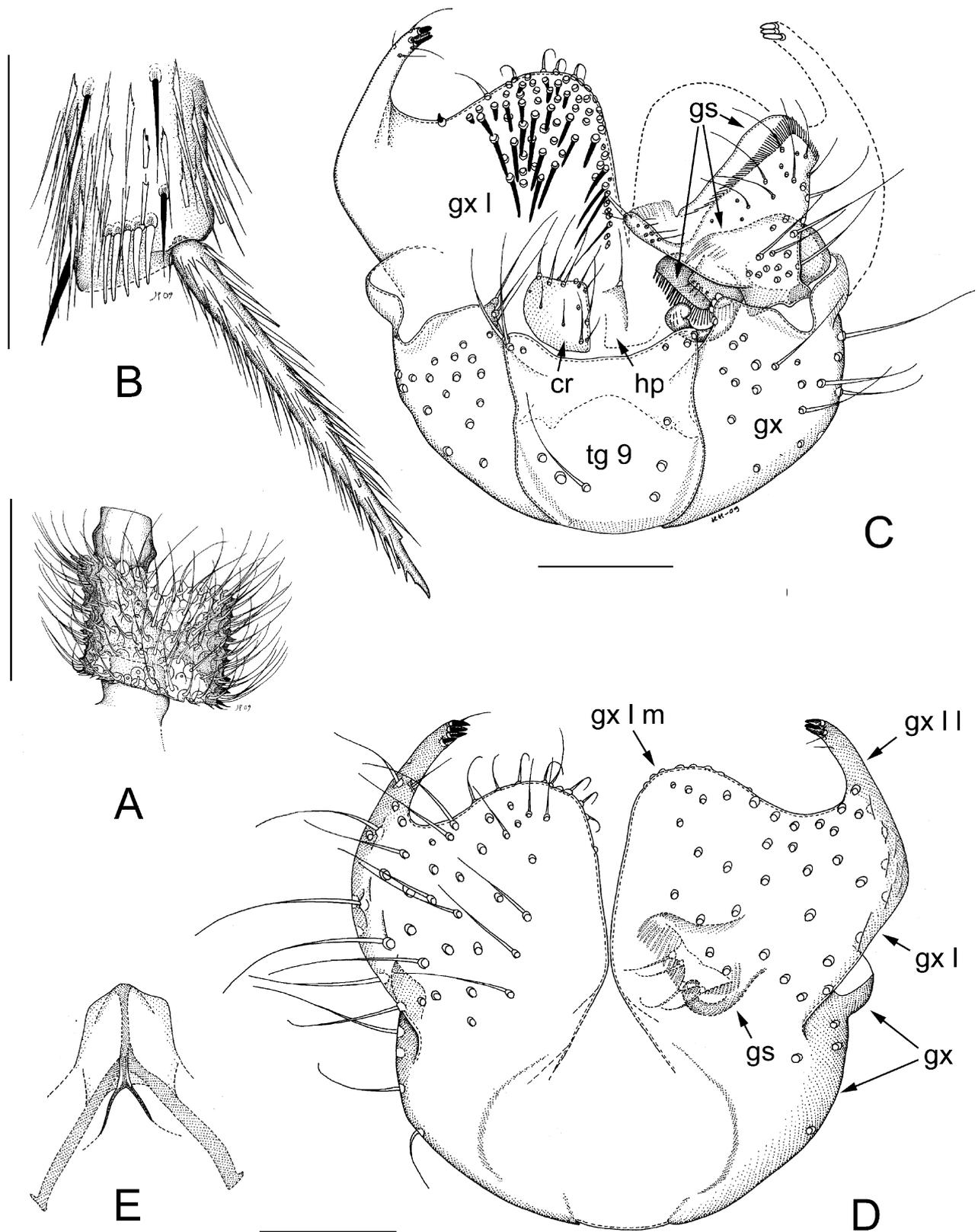
## Review of the species

### *Paramanota awanensis* Hippha, Jaschhof & Vilkkamaa, 2004

**Discussion.** *Paramanota awanensis* was described from Selangor, Malaysia, on the basis of the holotype male only (Hippha *et al.* 2004) and has not been recorded since. The species is very similar to *P. sumatrana* and is distinguished by the characters mentioned in the key. [insert FIGURES 1 and 2 here]



**FIGURE 1.** Wing, dorsal view (A and C–F) and ventral view (B). **A, B.** *Paramanota grandaeva* sp. n. (holotype). **C.** *P. orientalis* Tuomikoski (Thailand). **D, F.** *Paramanota furcillata* sp. n. (D holotype, F paratype). **E.** *P. bifalx* sp. n. (holotype). Scale 1.0 mm.



**FIGURE 2.** *Paramanota bifalx* sp. n. (holotype). **A.** Antennal flagellomere 4, lateral view. **B.** Apical part of front tibia, prolateral view. **C.** Hypopygium, dorsal view. **D.** Hypopygium, ventral view. **E.** Aedeagus with associated structures, ventral view. Scale 0.10 mm. cr = cercus, gs = gonostylus, gx = gonocoxa, gx I = ventral gonocoxal lobe, gx I m = mesial sub-lobe of the ventral gonocoxal lobe, gx II = lateral sub-lobe of the ventral gonocoxal lobe, hp = hypoproct, tg 9 = tergite 9.

***Paramanota bifalx* sp. n.**

Figs 1 E, 2 A–E

Male. **Colour.** Head yellowish brown, vertex darker brown, antennal flagellomeres 2–14 brown; setae and other vestiture dark. Thorax yellowish brown, scutum and scutellum brown, the former a little paler postero-laterally and at posterior margin, anterior part of anepisternum, laterotergite and the medial part of mediotergite slightly infuscated; the thoracic setae dark. Legs yellowish brown, middle and hind femur infuscated ventrally at apex, the setae and other vestiture dark. Wing brownish; haltere yellowish brown with dark brown knob. Abdomen brown, hypopygium yellowish brown on basal half, setae dark. **Head.** Antennal flagellomere 4, Fig. 2 A. Other parts of head lost in the single specimen before a detailed study. **Thorax** similar to Fig. 8a in Hippa *et al.* (2004). **Legs.** Apical part of tibia 1, Fig. 2 B. **Wing,** Fig. 1 E. Wing length 2.0 mm. **Hypopygium,** Figs 2 C, D, E: Gonocoxae ventrally separated by a membranous area, each side appearing as a very large lobe, posteriorly extending further than the gonostylus, the posterior part two-lobed with a broad mesial lobe and narrow lateral lobe, the latter appearing as a curved prong; the ventral surface evenly rather long setose, the lateral lobe with 3–4 megasetae at apex, the dorsal surface of the broader mesial lobe with an area of numerous megasetae. The part of gonocoxa visible in dorsal view simple with the setae similar to those of the ventral side. Tergite 9 simple, the posterior margin concave, the posterolateral corner only slightly lobe-like prolonged, the setae similar to gonocoxa. Cercus simple. Hypoproct as long as cercus, each half about one third of the width of cercus, each half with 1 seta. Latero-ventrad from the hypoproct there is a setose sclerite which cannot be well observed in any of the slides and which is not drawn in Fig. 2 C. Gonostylus with a dorsal lobe, a ventral lobe and a bifid lobe between them; the dorsal lobe in dorsal view subtriangular, with a comb-like row of submembranous pale lamellae along the posterior margin; the ventral lobe expanded at apex, with a mesial comb-like row of black sclerotized lamellae and on the ventral side of the comb with a plate-like small lobe with four setae at margin; one part of the bifid lobe with an aggregation of black lamellae, the other part with a curved finger-like appendix. Parameres and aedeagus fused to form a sub-quadrangular sclerite, slightly longer than broad, aedeagal apodemes long, directed obliquely anteriod, ejaculatory apodemes similar but smaller.

Female. Unknown.

**Discussion.** *Paramanota bifalx* is similar to *P. peninsulae*. Both of these species differ from the other *Paramanota* by the ventral gonocoxal lobe which has a narrow prong-like sub-lobe in a lateral position, unlike *P. orientalis*, *P. paxillosa* and *P. schachti* which has no prong-like lobe or *P. furcillata*, *P. awanensis* and *P. sumatrana* having it in a mesial position. *P. bifalx* can be distinguished from *P. peninsulae* by the following characters: 1) the narrow lateral sub-lobe on the ventral gonocoxal lobe has a few megasetae at the actual apex, in *P. peninsulae* there are numerous megasetae covering all of the mesial side of the lobe, 2) the bifid lobe on the gonostylus, between the dorsal and ventral lobes, has the part without black lamellae curved, not straight and 3) the parameres and aedeagus are completely fused, in *P. peninsulae* the apices of parameres are free, visible as subtriangular lobes at the apex of aedeagus.

**Etymology.** The name is Latin, *bi-*, two-, *falx*, sickle, referring to the pair of sickle shaped ventral lobes of the gonocoxa.

**Types.** *Holotype.* Male. THAILAND, Nakhon Si Thammarat, Namtok Yong NP, TV aerial, 814.262'N 9948.289'E, 966m, Malaise trap 15–22.ix.2008, Paiboon leg., T3540 (in QSBG).

***Paramanota furcillata* sp. n.**

Figs 1 D, F, 3 A–F

Male. **Colour.** Head yellowish brown, clypeus and vertex darker brown, antennal flagellomeres 2–14 brown; setae (almost all lost on face) and other vestiture dark. Thorax yellowish brown, scutum and scutellum brown, anterior part of anepisternum, laterotergite and the medial part of mediotergite slightly infuscated, in one paratype almost all of anepisternum, postero-ventral part of laterotergite and a wide median area of

mediotergite almost as dark as scutellum; the thoracic setae dark. Legs yellowish brown, middle femur very slightly infuscated ventrally at apex, hind femur infuscated ventrally at apex or on whole apical half; the setae and other vestiture dark. Wing brownish; haltere yellowish brown with dark brown knob. Abdomen brown, hypopygium concolorous with the other parts; setae dark. **Head.** Antennal flagellomere 4, Fig. 3 A. Maxillary palp similar to fig. 7 a in Hippa *et al.* (2004), ultimate palpomere 1.8–2.0 times longer than the penultimate one. The strong postocular setae are broken off from all specimens and could not be counted. **Thorax.** Similar to Fig. 8a in Hippa *et al.* (2004). **Legs.** Apical part of tibia 1, Fig. 3 B. **Wing,** Figs 1 D, F: in one of the paratypes the basal parts of  $M_1$  and  $M_2$  and stM visible as clear shades. Wing length 2.0–2.3 mm. **Hypopygium,** Figs 3 C–F: Gonocoxae ventrally separated by a membranous area, each side appearing as a very large lobe, posteriorly extending further than the gonostylus, the posterior part two-lobed with a narrow very long mesial lobe and broad short lateral lobe; the ventral surface evenly setose, the dorsal surface of the narrow mesial sub-lobe with 6–10 megasetae intermixed with a few usual setae. The gonocoxa part visible in dorsal view simple with the setae similar to those of the ventral side. Tergite 9 simple, the posterior margin convex, the posterolateral corner not prolonged; setae similar to gonocoxa. Cercus simple. Hypoproct as long as cercus, each half about one third of the width of cercus, each half with ca. 2 setae. Latero-ventrad from the hypoproct there is a setose sclerite which cannot be well observed in any of the slides and which is not drawn in Fig. 3 C. Gonostylus with a dorsal lobe, a ventral lobe and a large lobe between them; the dorsal lobe in dorsal view sub-quadrangular with the apicomésial angle prolonged and acute, with a comb-like row of submembranous pale lamellae along the posterior margin; the ventral lobe expanded at apex, with a mesial semicircular comb-like row of black sclerotized lamellae; the lobe between the dorsal and ventral lobes simple. Parameres free from aedeagus. Aedeagus elongate sub-quadrangular, posteriorly bifid or bilobed, slightly different in all specimens, aedeagal apodemes broad, sub-parallel, ejaculatory inverted T-shaped.

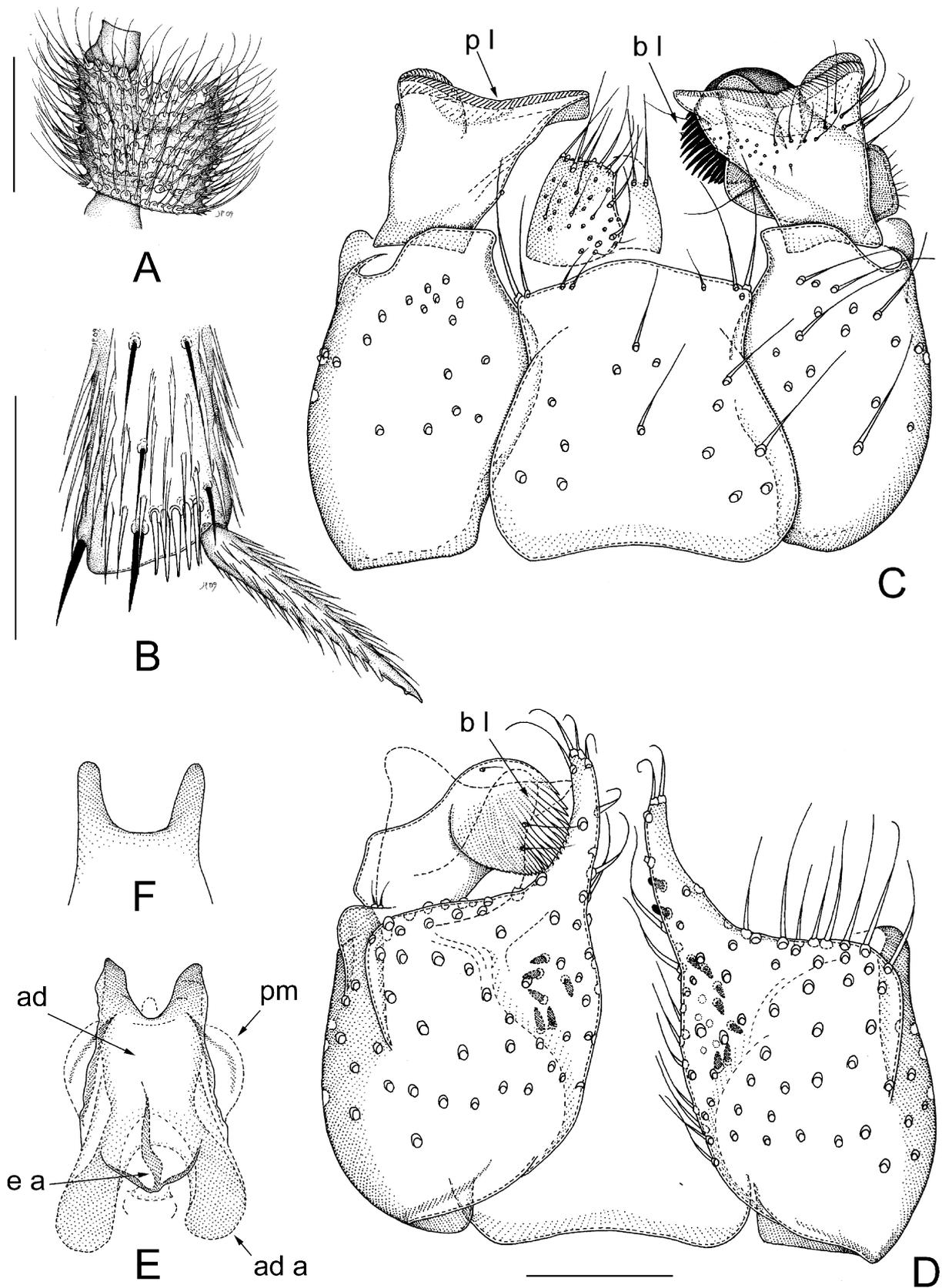
Female. Unknown.

**Discussion.** *Paramanota furcillata* is similar to *P. awanensis* and *P. sumatrana*. All three species differ from the other *Paramanota* by the ventral gonocoxal lobe which has a narrow prong-like sub-lobe in a mesial position, with the other species either lacking a prong-like lobe (*P. orientalis*, *P. paxillosa* and *P. schachtii*) or having it in a lateral position (*P. bifalx* and *P. peninsulae*). *P. furcillata* differs from both *P. awanensis* and *P. sumatrana* by having the narrow mesial sub-lobe of the ventral gonocoxal lobe contiguous with the posterior margin of the gonocoxa, not arising from the dorsal surface of the gonocoxa so that the posterior margin of gonocoxa crosses the base of the mesial lobe. Further, the mesial sub-lobe is long, extending as far posteriorly as the gonostylus (in *P. awanensis* and *P. sumatrana* it is shorter, posteriorly extending only to the middle of the gonostylus), it is narrowing from base to the apex (nearly equilateral), it lacks megasetae at apex (several megasetae at the apex) and there are no megasetae at the posterior margin of the broader lateral sub-lobe of gonocoxa (in *P. awanensis* there is a long comb-like row of megasetae along the posterior margin, in *M. sumatrana* there are two widely separated short rows). *P. furcillata* is similar to *M. awanensis* (and differs from *P. sumatrana*) by having only one comb-like aggregation of black lamellae on the gonostylus (two aggregations) and by having the aedeagus longer than broad with the apodemes directed anterior (broader than long with the apodemes directed laterad). *P. furcillata* differs by having two horn-like lateral lobes at aedeagal apex (two transverse lobes with their posteriorly pointing apices placed at the medial line).

**Etymology.** The name is Latin, *furcillata*, having a small fork, referring to the forked posterior part of the aedeagal complex.

**Types.** *Holotype.* Male. THAILAND, Petchaburi, Kaeng Krachan NP, Panernthung/km27/water pump, 1249.151'N 9922.483'E, 950m, Malaise trap 8–15.viii.2008, Sirichai & Chusak leg., T4350 (in QSBG).

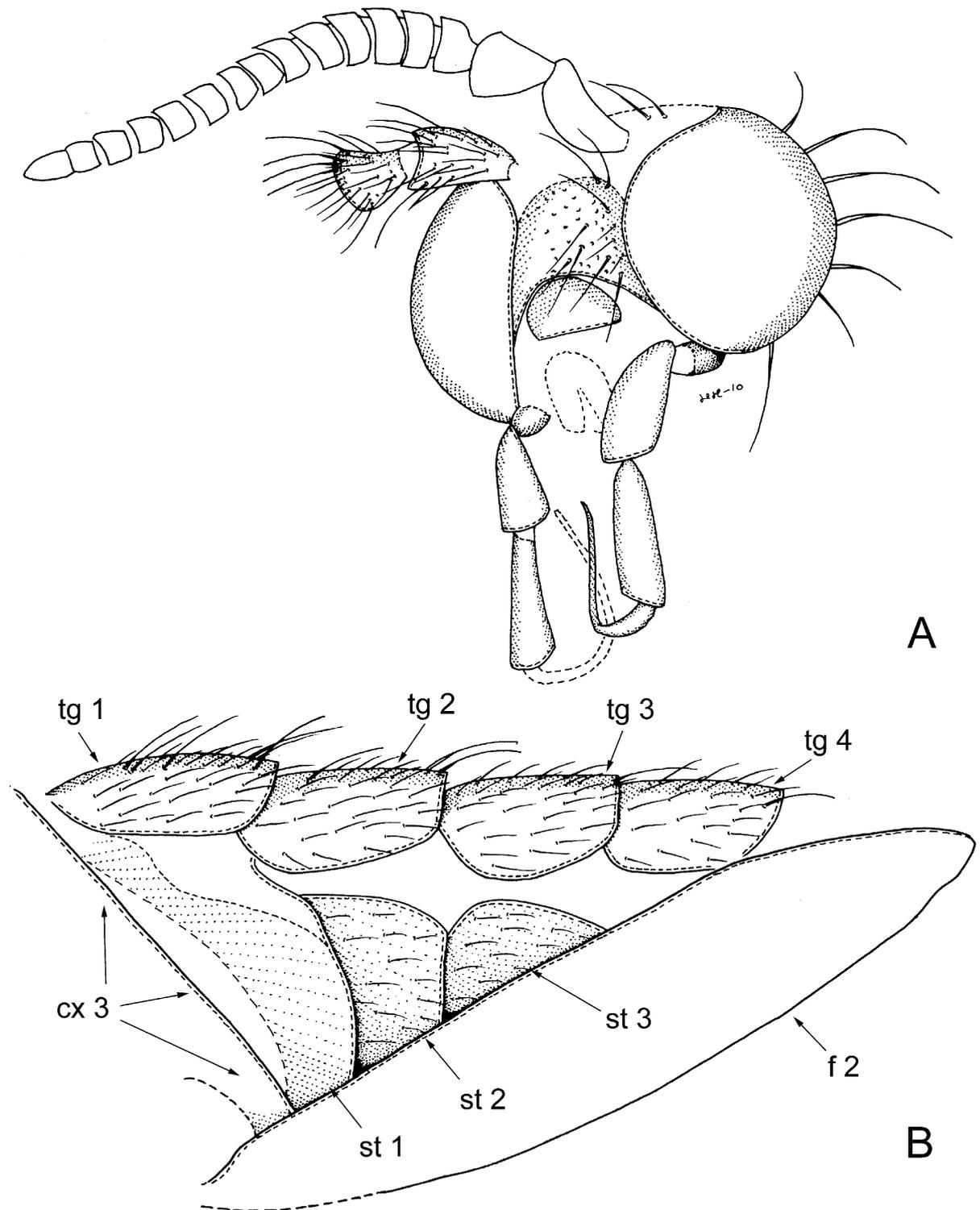
*Paratypes.* 1 male, THAILAND, Surat Thani, Khao Sok NP, Headquarter, 854.896'N 9831.81'E, 115m, Malaise trap 14–21.x.2008, Pongphan leg., T3399 (in QSBG); 1 male with same data except 21–28.x.2008, T3400 (in QSBG); 1 male with same data except 20–27.i.2009, T3911 (in QSBG).



**FIGURE 3.** *Paramanota furcillata* sp. n. (A, B, C, D and F holotype, E paratype). **A.** Antennal flagellomere 4, lateral view. **B.** Apical part of front tibia, prolateral view. **C.** Hypopygium, dorsal view. **D.** Hypopygium, ventral view. **E.** Aedeagus with associated structures, ventral view. **F.** Apical part of aedeagus, ventral view. Scale 0.10 mm. ad = aedeagus, ad a = aedeagal apodeme, bl = black lamellae, e a = ejaculatory apodeme, pl = pale lamellae, pm = paramere.

*Paramanota grandaeva* sp. n.

Figs 1 A, B, 4 A, B



**FIGURE 4.** *Paramanota grandaeva* sp. n. (holotype). **A.** Head, oblique frontal view. **B.** Basal part of abdomen, latero-ventral view. Scale 1.0 mm. cx 3 = hind coxa, f 2 = middle femur, st 2–st 3 = sternites 2–3, tg 1–tg 4 = tergites 1–4.

Female. The single specimen is in amber which is partly milky so that many characters are invisible. **Colour.** Pale brown, face dark brown, finer setae and trichia pale brown, the thicker ones dark brown to black. **Head,** Fig. 4 A: medial part of eyes and the ocelli not visible, the curvature of the mesial margin of eye suggests the presence of an eye bridge. Antenna, Fig. 4 A: setae on scapus and pedicellus unusually long. Maxillary

palpus, Fig. 4 A: basal segmentation fairly indistinguishable, no sensory pit on the antepenultimate palpomere, ultimate palpomere twice as long as the penultimate one. Number of strong postocular setae 7. **Thorax.** Similar to fig. 8 a in Hippa *et al.* (2004) except for prothoracic pleura which has longer setae, the longest ones being as long as the long postocular setae. **Legs.** Front tibia is seen in ventral view and the characters apically on the prolateral side are not visible. **Wing,** Figs 1 A, B: Sc unusually strong, as strong as  $R_1$ ,  $R_s$  not observed with certainty. Wing length 3.2 mm. **Abdomen,** Fig. 4 B: sternite 1 large, sloping postero-ventrad, its posterior part pushed over the base of sternite 2, the medial part (anterior to the broken line in Fig. 4 B) seems to be membranous but it is not fully visible because of the milkyness. Apical part of abdomen not very visible, similar to fig. 11 d in Hippa *et al.* (2004), the apical cercomere slightly larger.

Male. Unknown.

**Discussion.** Three of the key characters of *Paramanota* cannot be seen in the holotype of *P. grandaeva*: i. e. the complete eye bridge, medially divided anterior ocellus and the transverse comb-like row of strong setae prolaterally at the apex of front tibia. The two first characters are obscured by the milkyness of the amber, the latter because both of the front tibiae are visible in ventral aspect. Otherwise the species is quite similar to the recent *Paramanota* and does not differ more than can be expected between closely related species. When compared with all the recent *Paramanota*, *P. grandaeva* has h and Sc more strongly sclerotized, equal to  $R_1$  instead of being conspicuously weaker, and Sc is slightly longer. This is supposedly true for both sexes.

**Etymology.** The name is Latin, *grandaeva*, ancient, referring to the discovery of the species in Baltic amber.

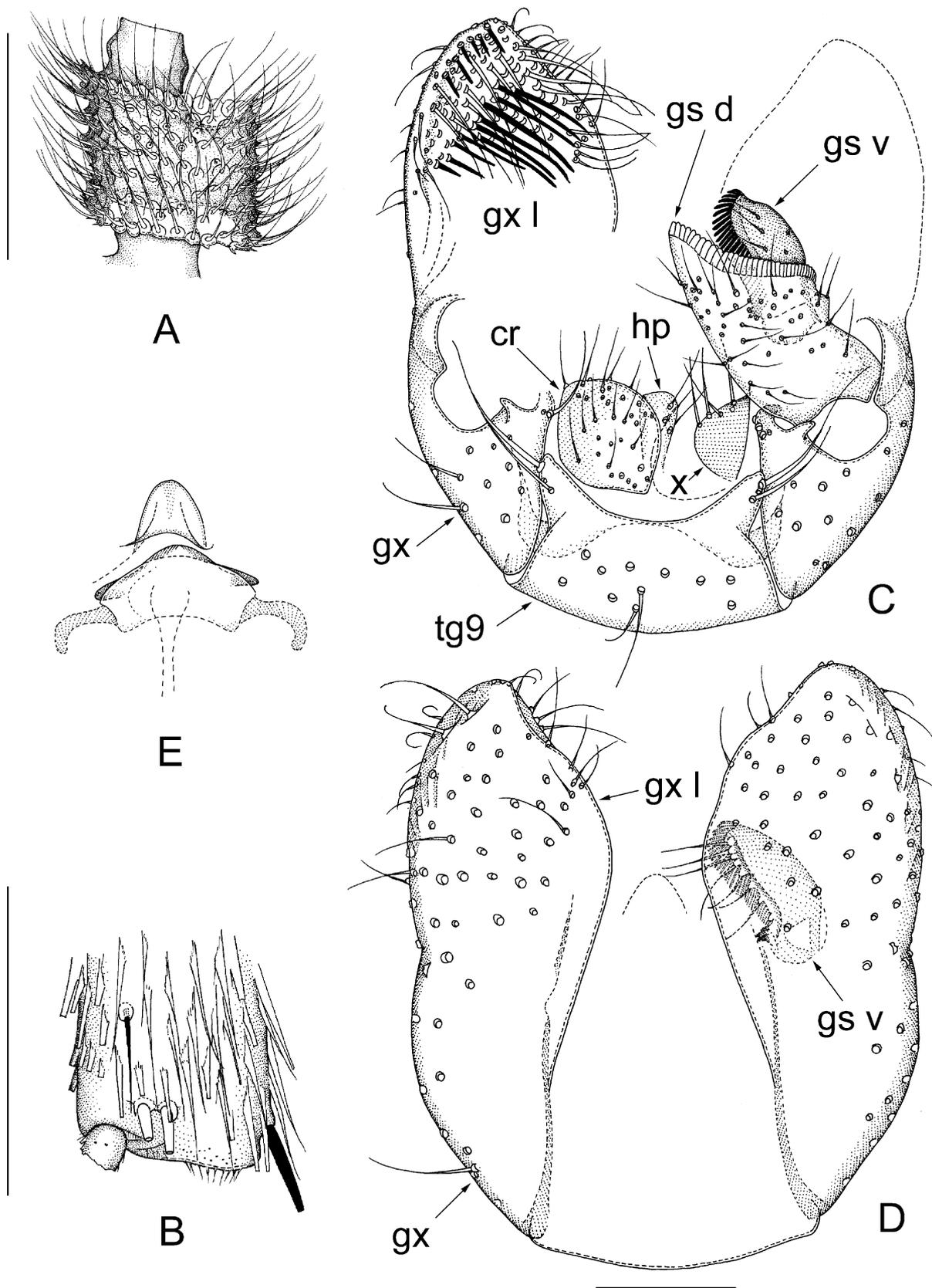
**Types.** *Holotype.* Female, Baltic amber; Eocene: Lutetian; Sambia, former East Prussia; ex coll. Albertus University Königsberg. Labelled GZG.BST.02724 (G4393) (in GZG).

### *Paramanota orientalis* Tuomikoski, 1966

Figs 1 C, 5 A–E

Male. **Colour.** Head yellowish, vertex brown, antennal flagellomeres 5–14 brown; setae (all lost on face) and other vestiture dark. Thorax yellowish, scutum brown with the anterior third paler yellowish brown, scutellum brown, mediotergite medially widely brown, anepisternum infuscated antero-dorsally; setae dark. Legs yellowish, middle femur very slightly infuscated ventrally at apex, hind femur infuscated dorsally and ventrally at apex, dorsally on apical third, ventrally on apical half; setae and other vestiture dark. Wing brownish; haltere yellowish brown with dark brown knob. Abdomen brown, hypopygium concolorous with the other parts; setae dark. **Head.** Antennal flagellomere 4, Fig. 5 A. Maxillary palp similar to fig 7 a in Hippa *et al.* (2004), ultimate palpomere 1.9 times longer than the penultimate one. The strong postocular setae are broken in the specimen and could not be counted. **Thorax.** Similar to fig. 8 a in Hippa *et al.* (2004). **Legs.** Apical part of tibia 1, Fig. 5 B. **Wing,** Fig. 1 C. Wing length 2.7 mm. **Hypopygium,** Figs 5 C, D, E: Gonocoxae ventrally separated by a membranous area, each side appearing as a very large lobe, posteriorly extending much further than the gonostylus and with the posterior margin simple, the ventral surface evenly rather short setose, the dorsal surface posteriorly with an area of long setae, including a more lateral row of short and a more mesial row of long megasetae. The part of gonocoxa visible in dorsal view of hypopygium simple with the setae similar to those of the ventral side. Tergite 9 simple, the posterior margin concave, the posterolateral corner lobe-like prolonged, the setae similar to gonocoxa, one of the setae on the posterolateral lobe conspicuously long. Cercus simple, rather evenly short setose. Hypoproct as long as cercus, each half about one third of the width of cercus, each half with ca. 3 setae. Laterad from the hypoproct there is a crescent-shaped sclerite (x in Fig. 5 C) with ca. five setae at posterior margin. Gonostylus two-lobed, the dorsal lobe with a comb-like row of submembranous pale lamellae along the posterior margin, the ventral lobe with a comb-like row of black sclerotized lamellae along the mesial margin. Adeagus broader than long, with short oblique posterolateral lobes, the apodemes transverse; in the mount ejaculatory apodeme with associated parts is pushed unusually posterior (Fig. 5 E) Parameres not discernible in the mount, probably fused with aedeagus.

Female. Unknown.



**FIGURE 5.** *Paramanota orientalis* Tuomikoski (from Thailand). **A.** Antennal flagellomere 4, lateral view. **B.** Apical part of front tibia, prolateral view. **C.** Hypopygium, dorsal view. **D.** Hypopygium, ventral view. **E.** Aedeagus with associated structures, ventral view. Scale 0.10 mm. cr = cercus, gs d = dorsal gonocoxal lobe, gs v = ventral gonocoxal lobe, gx = gonocoxa, gx l = gonocoxal lobe, hp = hypoproct, tg 9 = tergite 9, x = crescent-shaped lobe.

**Discussion.** *Paramanota orientalis* was described from a single male from Burma, Kambaiti (Tuomikoski 1966) and has not been recorded since. The holotype has not been found among Tuomikoski's material in Zoological Central Museum, Helsinki, and may be lost. Tuomikoski's (1966) drawings of the hypopygium are rather rough but fit the present Thailand specimen rather well, differing in the following details: the posterolateral angle of tergite 9 is much less prolonged, the postero-mesial corner/angle of the dorsal lobe of the gonostylus is more prolonged and acute, and the megasetae on the dorsal surface of the ventral gonocoxal lobe are shorter and more widely distributed. In Tuomikoski's (1966) fig. 4 there is a comb-like lobe at the mesial margin of the gonostylus. It apparently belongs to the ventral lobe of the gonostylus, visible in the present Fig. 5 D. The Thailand specimen differs also from the holotype in colouration: the face is unicolorous yellow, not "ochraceous above, brownish below", the anterior third of scutum is pale yellowish brown, not concolorous brown with the main part of scutum and the middle and hind femora are not unicolorous "pale yellow" but have apical infuscations. Further, the Thailand specimen is smaller, with wing length 2.7 mm contra 3.8 mm. The overall similarities however between the Thailand specimen and Tuomikoski's (1966) description of *P. orientalis* indicate that these are the same species.

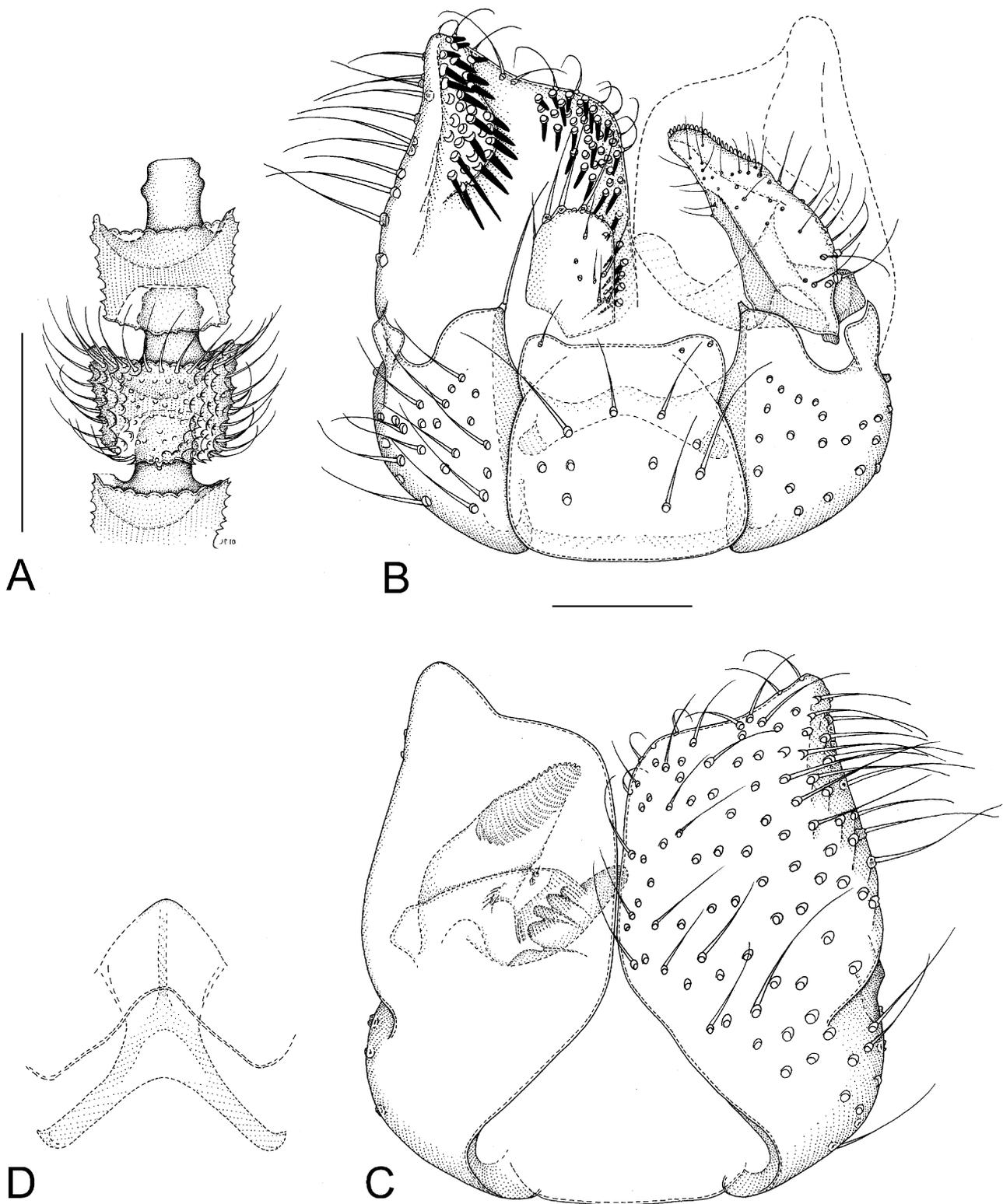
The practical identification of *P. orientalis* is rather easy. It is distinguished from all other described *Paramanota* by the ventral lobe of gonocoxa which is simple, posteriorly not divided into sub-lobes. *P. orientalis* is distinguished from the other species also by its simpler gonostylus which has only two main lobes instead of three or more, but this character may be difficult to see if the gonostylus cannot be studied from the side.

**Material studied.** 1 male, THAILAND Nan Doi Phu Kha NP, Office 14, 1912.488'N 1014.907'E, 1375m, Malaise trap 8–15.xii.2007, Charoen & Nikom leg., T3278 (in QSBG).

### *Paramanota paxillosa* sp. n.

Figs 6 A–D

Male. **Colour.** Head yellowish brown, vertex and antennal flagellomeres 2–14 darker brown; setae and other vestiture dark. Thorax yellowish brown, scutum and scutellum brown, antero-dorsal part of anepisternum infuscated; thoracic setae mostly worn out, the few existing ones dark. Legs yellowish brown, the setae and other vestiture dark. Wing brownish; haltere yellowish with dark brown knob. Abdomen brown, hypopygium yellowish brown on basal half, setae dark. **Head.** Antennal flagellomeres 3–5, Fig. 6 A. Maxillary palp similar to fig. 7 a in Hippa *et al.* (2004), ultimate palpomere 1.8 times longer than the penultimate one. The strong postocular setae are broken in the specimen and could not be counted. **Thorax** similar to fig. 8 a in Hippa *et al.* (2004). **Legs.** Front tibia lost on both sides. **Wing** similar to Fig. 1 D. Wing length 2.2 mm. **Hypopygium,** Figs 6 B, C, D: Gonocoxae ventrally separated by a membranous area, each side with a very large lobe which is posteriorly extending further than the gonostylus, with the posterior part shallowly divided into a broader mesial and narrower lateral sub-lobe; the ventral surface evenly covered with rather long setose, the dorsal surface of the broader mesial lobe with an area of numerous megasetae at the mesial margin; the dorsal surface of the narrower lateral lobe with a rounded ridge with numerous megasetae. The part visible in dorsal view of the gonocoxa is simple with setae similar to those of the ventral side. Tergite 9 simple, the posterior margin concave, the posterolateral corner only slightly lobe-like prolonged, setae similar to gonocoxa. Cercus simple. The hypoproct is slightly obscured in the slide and thus is not drawn in Fig. 6 B. There is a setose sclerite latero-ventrad from the hypoproct which cannot be easily observed in the slide and again is not drawn in Fig. 6 B. Gonostylus with a dorsal lobe, a ventral lobe and a curved median lobe; the dorsal lobe in dorsal view elongate subtriangular, tapering towards the apex, with a comb-like row of submembranous pale lamellae along the postero-lateral margin; expanded ventral lobe at apex, with a mesial comb-like row of dark sclerotized lamellae, and on the ventral side of the comb with a plate-like small lobe with four setae at margin; details of the long median lobe not observable; between the base of the latter and the ventral lobe there seems to be an aggregation of dark lamellae on a small lobe but the character is very difficult to see on the slide. Parameres and aedeagus fused, aedeagal apodemes long, directed obliquely anteriorly, ejaculatory apodeme not observable in the slide.



**FIGURE 6.** *Paramanota paxillosa* sp. n. (holotype). **A.** Antennal flagellomeres 3–5, lateral view. **B.** Hypopygium, dorsal view. **C.** Hypopygium, ventral view. **D.** Aedeagus with associated structures, ventral view. Scale 0.10 mm.

Female. Unknown.

**Discussion.** *P. paxillosa* is similar to *P. peninsulae* and *P. schachtii*. It is distinguished from both by having the dorsal lobe of the gonostylus in dorsal aspect widening from base to apex, not the opposite, by having the

median lobe of gonostylus as long as the dorsal and the ventral lobes, not only half of their length, and by having the ventral lobe of the gonostylus only slightly longer than broad instead of being several times longer. Furthermore, *P. paxillosa* differs from *P. peninsulae* by having the lateral sub-lobe on the ventral gonocoxal lobe shorter than broad, subtriangular, instead of being about twice longer than broad, thumb-like. In this respect *P. paxillosa* resembles *P. schachtii*, but the mesial sub-lobe is much more weakly pronounced than in the latter. See also under *P. schachtii*.

**Etymology.** The name is Latin, *paxillosa*, full of pegs, referring to the numerous peg-like megasetae dorsally on the ventral gonocoxal lobes.

**Types.** *Holotype*. Male. THAILAND, Nakhon Si Thammarat, Namtok Yong NP, TV aerial, 8°14.262'N 99°48.289'N, 966m, Malaise trap 11–18.viii.2008, Paiboon leg, T3109 (in QSBG).

#### ***Paramanota peninsulae* Hippra, Jaschhof & Vilkkamaa, 2004**

**Discussion.** *Paramanota peninsulae* was described from numerous specimens from Pahang and Selangor, Malaysia (Hippra *et al.* 2004), but has not been recorded since. The species is similar to *P. paxillosa* and *P. schachtii*. For further discussion, see under the latter two.

#### ***Paramanota schachtii* Papp, 2004**

**Discussion.** *Paramanota schachtii* was described from the holotype and one paratype from Taiwan (Papp 2004) and has not been recorded since. I have not studied any material of the species. Judged from the original description the species differs from other *Paramanota* by the ventral gonocoxal lobe which is posteriorly divided into two nearly equal rounded sub-lobes instead of being simple (*P. orientalis*) or having either the more lateral (*P. peninsulae*, *P. paxillosa* and *P. bifalx*) or the more mesial (*P. awanensis*, *P. bifalx* and *P. sumatrana*) sub-lobe conspicuously narrower than the other one. Except for the gonocoxal lobe *P. schachtii* is very similar to *P. peninsulae*, especially in the gonostylus which has the ventral lobe with its mesial comb-like row of black lamellae longer than the other *Paramanota*. For further discussion, see under *P. paxillosa*.

#### ***Paramanota sumatrana* Hippra, Jaschhof, & Vilkkamaa 2004**

**Discussion.** The species was described on the basis of the holotype male and one paratype female (Hippra *et al.* 2004) from Sumatra and has not been recorded since. In the original description (Hippra *et al.* 2004, fig. 11c) the drawing of the aedeagus complex (as tegmen and parameres) may be misleading because only the posterior parts were drawn; the whole structure is rather strongly tilted and the more anterior parts partially obscured on the slide. Anteriorly there seems to be oblique apodemes resembling those in *P. bifalx* (Fig. 2 E), *P. paxillosa* (Fig. 6 D) and *P. peninsulae* (Hippra *et al.* 2004, fig. 9 d). *P. sumatrana* is very similar to *P. awanensis*. It is distinguished by the characters mentioned in the key.

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