FOLIA HISTORICO-NATURALIA MUSEI MATRAENSIS
2015 39: 63–71

Presence of two extant genera of dusty lacewings (Neuroptera: Coniopterygidae) in Baltic amber, with remarks on some earlier described fossil taxa

György Sziráki & Carsten Gröhn

Abstract: Two specimens determined as *Semidalis fritschi* (Enderlein, 1930) and a *Parasemidalis* sp. from the considerable amber collection with insect inclusions of the second author are discussed. Moreover, it is pointed out that *Heminiphetia* Enderlein, 1930 is a junoir synonym of *Semidalis* Enderlein, 1905, *Gallosemidalis* Nel, Perrichot & Azar, 2005 is a junior synonym of *Parasemidalis* Enderlein, 2005, while the Cretaceous genus *Libanosemidalis* Azar, Nel & Solignac, 2000 closely related to *Parasemidalis*. Paratype of *Gallosemidalis eocenica* Nel, Perrichot & Azar, 2005 belongs to the genus *Coniopteryx*, and it is the eldest known representative of this genus. *Hemisemidalis sharovi* Meinander, 1975 is a *Parasemidalis* species, and *H. kulickae* Dobosz & Krzemiñski, 2000 also not a *Hemisemidalis* Meinander, 1972, but with high probability belongs to a hitherto undescribed fossil coniopterygid genus.

Introduction

Regarding the countless lumps of Baltic amber with insect inclusions, the number of Neuroptera fossils preserved in this manner is surprisingly low. Such remainings of Coniopterygidae turned up sporadically as well. The first species representing this lacewing family, namely the *Coniopteryx timidus* (Hagen, 1856), was published in the middle of the 19th century. The next one (*Archiconiocompsa prisca* Enderlein, 1910) was described more than fifty years later, while the other five species (*Archiconis electrica* Enderlein, 1930, *Heminiphetia fritschi* Enderlein, 1930, *Hemisemidalis sharovi* Meinander, 1975, *Hemisemdalis kulickae* Dobosz & Krzeminski, 2000 and *Geroconiocompsa ostara* Engel, 2010) within the subsequent one-hundred years. Moreover, apart from the *Archiconiocompsa prisca*, no additional specimens of these species were reported until the present (2015) year. This circumstance emphasizes the importance of the second author's private collection, with a considerable number of Baltic amber coniopterygids, from which photographs of five adults and a larva will be given in a new book (Gröhn in press).

In the present paper taxonomic evaluations of two specimens of the above mentioned collection are given. Besides, these investigations offer a possibility to discuss the taxonomic position of some earlier described Baltic amber coniopterygid allied to (or identical with) the examined taxa.

Material and methods

The material investigated housed now in the private collection of Carsten Gröhn, Glinde, Germany, but in the future it will be deposited in Geologisch-paläontologisches Museum der Universität Hamburg.

The camera used was a Canon EOS 450D, while the microscope was Zeiss with Luminar-lens 40 mm 1:4/A0,13 and 16mm/A0,2.

As the wing venation regards, we follow the generally accepted terminology of KILLINGTON (1936) – including the abbreviations, while in the case of the female external genitalia we agree the interpretation of TJEDER (1957).

Systematic part

Semidalis Enderlein, 1905

Large genus, with somewhat more than 70 recent, and with one subfossil (copal) species. Worldwide distributed, with exception of the Australian and Oceanian Regions. Its diversity is the largest in the Neotropic Region, while only two species are living in the arboreal zone of the Palaearctic Region, and only one in Madagascar. The genus was based on *Coniopteryx aleyrodiformis* Stephens, 1836 (ENDERLEIN 1905), which may be the most widely distributed dusty lacewing species of the world, with rather large intraspecific variability. Besides, several other allied recent genera were described in the first three decades of the 20th century: such as *Alema* Enderlein,1905, *Alemella* Enderlein, 1906, *Niphas* Enderlein, 1908, *Protosemidalis* Karny, 1924, *Metasemidalis* Karny, 1924, *Ahlersia* Enderlein, 1929 and *Niphetia* Enderlein, 1930. The last one has been based on *Semidalis curtisana* Enderlein, 1906, which species was regarded to be a junior synonym of *S. aleyrodiformis* by KILLINGTON (1936). Consequently, also the genus *Niphetia* was regarded to be a junior synonym of *Semidalis* Enderlein, 1905 already by this author, while the other above mentioned genera were synonymized with *Semidalis* by MEINANDER (1972). It turned out that the alterations in the position of the cross vein R_1-R_{2-3}, or R_1-Rs, as well as R_{2+3}-R_{4+5} (which were regarded as basic distinctive features of the given genera) are very variable even at intraspecific level.

At the same time, the validity of the fossil genus *Heminiphetia* Enderlein, 1930 containing the single species *H. fritschi* Enderlein, 1930 was hitherto not queried. According to the corresponding figure of the original description (ENDERLEIN 1930) the cross vein M-Cu_1 oblique in both wings, striking the stem of M very near to the fork in the fore wing, and the branch M_{3+4} in the hind wing (Fig. 1). MEINANDER (1972) stated that in the case of this fossil genus „the wing venation resembles *Neosemidalis*", though in fore wing of *Neosemidalis* the cross vein M-Cu_1 is not oblique and situated far from the fork of M. Moreover, M-Cu_1 of hind wing bit the stem of M (MEINANDER 1972, Fig. 94), or (exactly or approximately) the fork of M (MEINANDER 1972, Fig. 97E).

On the contrary, the unique distinctive feature of wing venation of the genus *Semidalis* is that cross vein M-Cu_1 oblique in both wings (as in *Heminiphetia*), striking M_{3+4} in the hind wing (also as in *Heminiphetia*), and striking the longitudinal vein M of fore wing at different points; most frequently on the branch M_{3+4} (e.g. MEINANDER 1972, Fig. 200B), not so often on the fork (e.g. MEINANDER 1972, Fig. 199C), or rarely on the stem near to the fork (Fig. 2). In the latter case do not any differences between the such specimens of recent (and subfossil) *Semidalis* species and the type specimen of the fossil „*Heminiphetia*" *fritschi*. Consequently, *Heminiphetia* Enderlein, 1930 should be regarded as a junior synonyme of *Semidalis* Enderlein, 1905. (It is worth to mention that M-Cu_1 cross vein of fore wing of *Semidalis copalina* Meunier, 1910 bit the stem of M (MEUNIER 1910, Fig. 2); nevertheless MEINANDER (1972) accept it as a *Semidalis* species.)

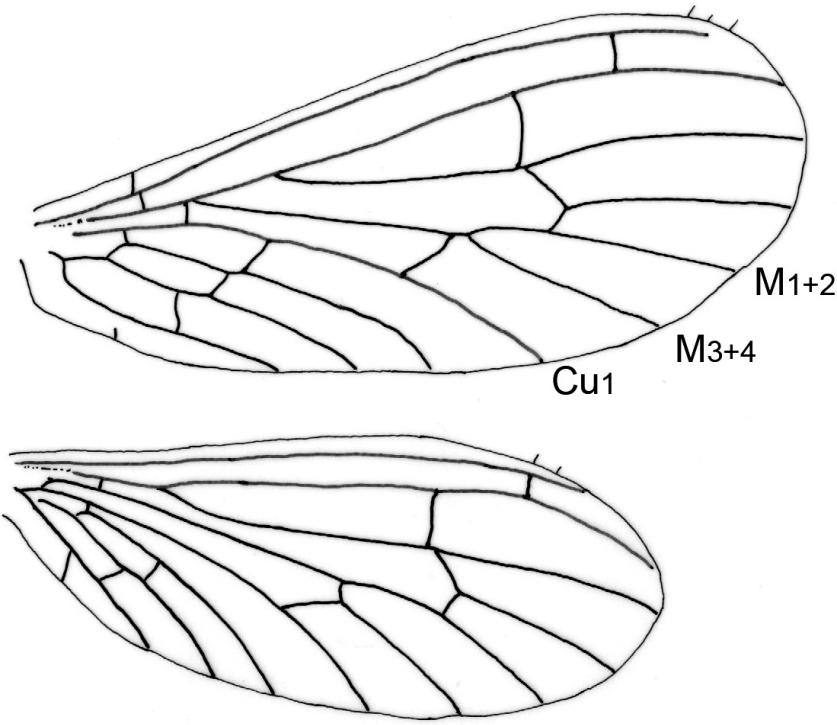

Fig. 1. Wings of the holotype of *Heminiphetia fritchi* Enderlein (after ENDERLEIN 1930, Fig. 1)

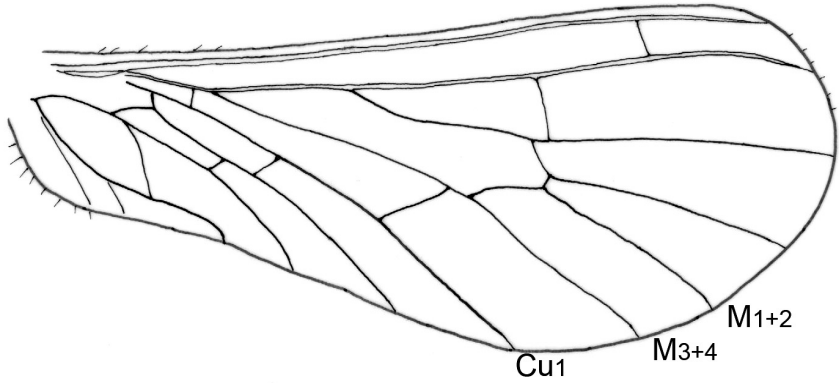

Fig. 2. Fore wing of a *Semidalis aleyrodiformis* (Stephens) specimen from Fenyőfő (Bakony Mountains, Hungary)

Besides, the frequency of the relative proximal situation of M-Cu_1 in the fore wing may be different in various species. It was not studied thoroughly, but an unpublished survay of the first author showed that 1 of 40 specimens had M-Cu_1 cross vein basally of the fork of the longitudinal vein M in a Hungarian population of *S. aleyrodiformis* (Fig. 2), and 2 of 20 specimens in the case of *S. mascarenica* Fraser, 1952 in a material from Madagascar.

Semidalis fritschi (Enderlein,1930) (Figs 3-4)

Age: Late Eocene. It is embedded in a translucent lump of Baltic amber, together with some debris and air bubbles. Inventory number: 2888.

Head – together with palpi and antennae –, as well as the legs are not visible clearly, though length of antenna ca. 1.4 mm. Mesothorax with dark shoulder spots, abdomen visible below the right fore wing. The left fore wing inversed around its longitudinal axis, right hind wing folded along the vein M. Shape of the wings is the same as in many species of *Semidalis* (e.g. as in *S. africana* Enderlein, 1906 (ENDERLEIN 1906, Fig. 14)), and the venation agrees entirely with those specimens of the genus where M-Cu_1 bit the stem of M (e.g. as in Fig. 2). Length of the fore wing 3.4 mm, of hind wing 2.7 mm. Wing membrane hyaline, without any pattern. Most of the veins medium brown, fringes short.

Remarks: The species level identification of the vast majority of coniopterygids is possible only on the basis of the examination of male genitalia. However, nowadays the species diversity regarding the genus *Semidalis* is very low on some large geographical territories (see above). Consequently, it has a considerable probability that about 40 million years ago the species diversity of this genus may be low in the amber-bearing forests of Fennoscandia as well, and the present specimen – considering also that it has not any distinctive eidonomical features, e.g. some wing patterns – belongs to the same species as the holotype of *Heminiphetia fritschi* (i.e.: *Semidalis fritschi*).

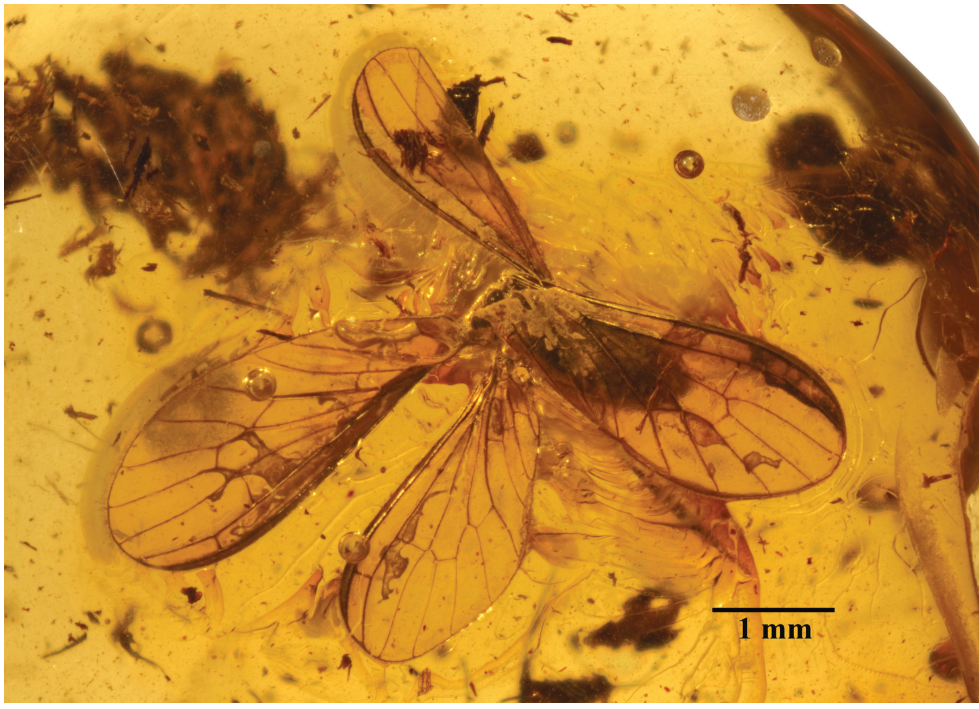

Fig. 3. *Semidalis fritschi* (Enderlein), habitus; Gröhn collection, inventory number: 2888

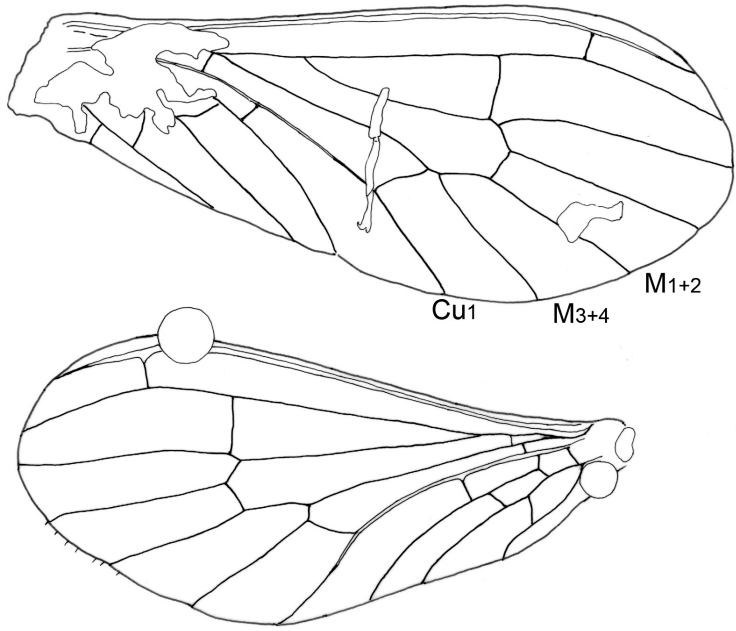

Fig. 4. *Semidalis fritschi* (Enderlein), right fore wing and left hind wing; Gröhn collection, inventory number: 2888

Parasemidalis Enderlein,1905

Small genus with 8 recent species belonging to three subgenera (Sziráki 2009): *Canarisemidalis* Sziráki, 2009, *Parasemidalis* Enderlein, 1905 s.str. and *Stangesemidalis* González Olazo, 1984. Distributed in the Palaearctic, Nearctic and Neotropic Regions.

No fossil species was hitherto assigned to the genus *Parasemidalis*. On the other hand, there are two Baltic amber coniopterygid (described in different genera), which should be regarded as *Parasemidalis*.

In his paper on fossil coniopterygids Meinander (1975) described the *Hemisemidalis sharovi* on the basis of a female specimen. In connection of the wing venation it was stated by him, that it agrees with description of the genus „except that … in the hind wing the cross-vein M-Cu_1 strikes M perpendicularly, instead of slightly obliguely, as in the earlier described species of *Hemisemidalis*…". However just this „exception" is the difference between the wing venation of genera *Hemisemidalis* and *Parasemidalis* (see Sziráki 2011, key for the genera of the subfamily Coniopteryginae p. 128–129). Therefore, the given species was the first described fossil representative of the genus *Parasemidalis*, and its correct name: *Parasemidalis sharovi* (Meinander, 1975) (new combination). (Besides, in the original description it was mentioned that the genitalia „are surrounded by some milky substance, which … makes a closer study of them impossible". Thus these structures do not offer possibility to support of any statement in connection of the identification.)

The subgeneric position of *Parasemidalis sharovi* is uncertain, first of all because the basal part of the hind wing is invisible.

More recently *Gallosemidalis eocenica* Nel, Perrichot & Azar, 2005 was described as a new genus and new species (Nel et al. 2005). In the very detailed discussion given in the original description it was stated that „…*Stangesemidalis* González Olazo, 1984 has also a base of Rs very close to that of M in hind wing and a general wing venation very similar to those of *Gallosemidalis*…", and „*Gallosemidalis* differs from *Stangesemidalis* in its pedicel only slightly longer than wide, instead of being two times longer than broad (González Olazo 1984)".

In a framework of a comparative examination of the *Parasemidalis* and *Stangesemidalis* species (Sziráki 2009) it turned out that *Stangesemidalis* is a subgenus of the genus *Parasemidalis*, rather close to the Palaearctic subgenus *Canarisemidalis* (= *P. alluaudina* group sensu Meinander 1972). There is not any differences between these two subgenera regarding the wing venation; Rs branching off from R_1 very near to the wing base of hind wing not only in *Stangesemidalis,* but also in *Canarisemidalis*, e.g. as in *Parasemidalis (Canarisemidalis) alluaudina* (Meinander 1962, Fig. 3 as *Parasemidalis canariensis*). In fact, the wing venation of *Gallosemidalis* agrees well with the wing venation not only of the Neotropical subgenus *Stangesemidalis* but also that of the Palaearctic subgenus *Canarisemidalis*. Besides, the „ellipsoidal" last segment of labial palp of *Gallosemidalis eocenica* (Nel et al. 2005) agrees well with the „swollen, egg-shaped" apical segment of palpus labialis of *Parasemidalis* (Meinander 1972).

As the length of the pedicel (the only stated distinctive feature between the *Gallosemidalis* and two subgenera of *Parasemidalis*) regards, it slightly longer than the wide in *Canarisemidalis* (as in *Parasemidalis fusca*, Meinander 1963), while in *Stangesemidalis* it may be rather variable, even at intraspecific level. According to the reexamination of the type material of *Stangesemidalis subandina* González Olazo, 1984 the pedicel 1.3-1.7 times as long as broad, while in *Parasemidalis (Stangesemidalis) enriquei* Sziráki, 2009 this ratio is 1.2-1.8 (Sziráki 2009).

Thus there is not any differences between *Gallosemidalis* and two subgenera of *Parasemidalis*. Consequently, *Gallosemidalis* Nel, Perrichot & Azar, 2005 should be regarded as a junior synonym of *Parasemidalis* Enderlein, 2005.

It is already another problem that the paratype of *Gallosemidalis eocenica* is not conspecific with the holotype of the species. Regarding the unforked vein M of the hind wing (Nel et al 2005, Fig. 3) it is clearly a *Coniopteryx* specimen, which is the eldest known representative of the genus.

In addition to the above discussed taxa, there is a further genus, with wing venation rather similar to that of the subgenera *Canarisemidalis* and *Stangesemidalis*, namely the *Libanosemidalis* Azar, Nel & Solignac, 2000 from the Lower Cretaceous amber of Lebanon. Besides, even the male terminalia of *Libanosemidalis hammanaensis* (Azar et al. 2000, Figs 2 and 3/5) are rather resembling to those of *P. (S.) enriquei* (Sziráki 2009, Fig. 28). However, the length of the longitudinal part of Sc_2 takes about 1/3 of the length of the fore wing of *Libanosemidalis*. This unusually long Sc_2, especially in the fore wing, seems to be enough to regard *Libanosemidalis* as a separate genus, thought closely related to *Parasemidalis*.

Finally, *Hemisemidalis kulickae* Dobosz & Krzemiński, 2000, the second amber species described as *Hemisemidalis*, has a hind wing with venation also very similar to that of *Parasemidalis*. On the other hand, the cross vein M-Cu_1 of the fore wing distinctly oblique, and because of this feature the fore wing venation of *H. kulickae* differs from both

Parasemidalis and *Hemisemidalis*. The single known specimen of *H. kulickae*, i. e. the holotype of the species, is really well preserved; the hairs of the abdomen, and the main structure of the female external genitalia are all well visible (Dobosz & Krzemiński 2000, Fig. 6). It seems clearly that gonapophyses laterales are small, rounded structures, without large, hooked bristles, instead of the prominent gonapophyses laterales with long, hooked bristles, characteristic for *Hemisemidalis* (e.g. in Meinander 1972 Fig. 190D). Moreover, according to Fig. 3 in the original description, the flagellomeres are conic, instead of the (short or elongated) cylindrical shape, usual in the family Coniopterygidae. Consequently, the species described as *Hemisemidalis kulickae* surely does not belong to the genus *Hemisemidalis*, but probable to an undescribed fossil genus.

Parasemidalis sp. (Figs 5-6)

Age: Late Eocene. It is embedded in a translucent lump of Baltic amber together with some debris and air bubbles. Inventory number: 2779.

The body covered by an air layer, thus pigmentation invisible. Head in lateral view about as high as broad. Eyes large. Antennae1.1 mm, light brown, 28 segmented. Scape and flagellar segments about as long as wide, pedicel somewhat longer than wide. Last segment of maxillary palpi slender. Wing membrane hyaline, veins light brown. Left hind wing inversed around the longitudinal axis, and basal half of its anterior part folded in an apically narrowing strip. Length of the fore wing 1.7 mm, of hind wing 1.4 mm. Wing venation shows the

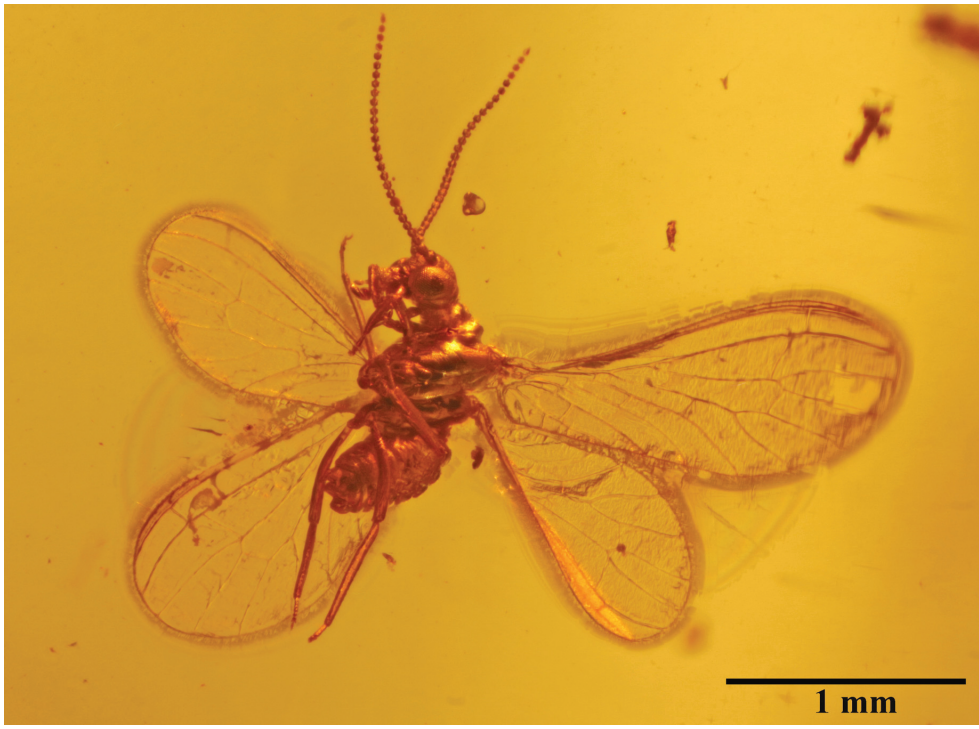

Fig. 5. *Parasemidalis* sp., habitus; Gröhn collection, inventory number: 2779

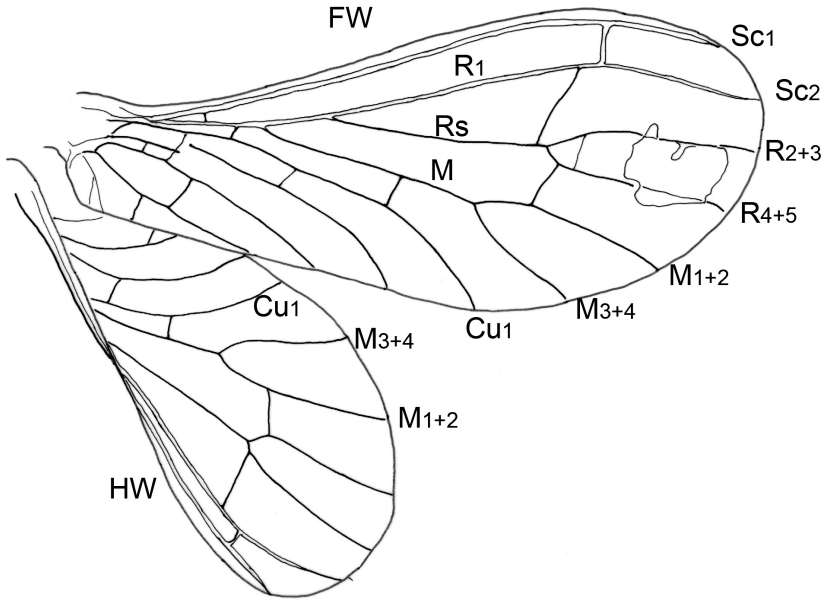

Fig. 6. *Parasemidalis* sp., right wings; Gröhn collection, inventory number: 2779.
FW = fore wing, HW = hind wing

distinctive features of the genus, i.e.: veins Rs and M forked in both wings, cross vein M-Cu_1 strikes the latter in right angle in fore wing, this cross vein is transverse (not oblique) in hind wing and situated well before the fork of M, Rs originates basally of the middle of hind wing, and basal parts of R and M fused. Cross vein R-M bit M_{1+2} distinctly apically from the fork in the fore wing, while Rs originates rather far from the wing base in the hind wing. Fringes short. The extra cross vein in left fore wing between the two branches of Rs clearly is an aberration. The examined specimen is a female. Ectoproct in its terminalia rounded, gonapophyses laterales seems to be stalked, as in *P. similis* Ohm, 1986 (MEINANDER 1972, Fig. 183C, as *Parasemidalis* sp.1). Eighth sternite strongly sclerotized. (This feature is characteristic for the genus.)

Subgeneric position of the species to wich the examined specimen belongs is uncertain, but because of the shape of the head capsule and the position of branching off of Rs it is closer to the *Parasemidalis* s.str. than to the two others. On the other hand, the situation of the cross vein R-M agrees that of the species of subgenus *Canarisemidalis*. (However, this character seems not to be entirely constant: in some cases cross vein Rs-M striking M_{1+2} in fore wing in *Parasemidalis (Parasemidalis) fuscipennis* (KILLINGTON 1936, Fig. 55B) also.)

However, the shape of the head of *Parasemidalis sharovi* was not discussed in the original description, and the basal part of the hind wing partly absent, partly covered by the fore wing, the apical part of its hind wing distinctly tapering, while in the examined specimen it is widely rounded. Thus, the latter one surely is not conspecific with *P. sharovi*. On the other hand – in our opinion – the available eidonomical features are not enough to describe it as a new species.

References

Azar, D., Nel, A. & Solignac, M. (2000): A new Coniopterygidae from Lebanese amber. – Acta Geologica Hispanica, 35: 31–36.

Dobosz, R. & Krzemiński, W. (2000): A new species of the Coniopterygidae (Neuroptera) from Baltic amber. – Polskie Pismo Entomologiczne, 69: 219–224.

Enderlein, G. (1905): Klassification der Neuropteren-Familie Coniopterygidae. – Zoologischer Anzeiger, 29: 225–227.

Enderlein, G. (1906): Monographie der Coniopterygiden.– Zoologische Jahrbücher (Abteilung für Systematik), 23: 173–242.

Enderlein, G. (1930): Die Klassifikation der Coniopterygiden auf Grund der recenten und fossilen Gattungen. – Archiv für Klassifikatorische und Phylogenetische Entomologie, 1: 98–114.

González Olazo, E. (1984): Stangesemidalis subandina, nuevo genero y especie de Coniopterygidae de la Republica Argentina (Neuroptera, Planipennia). – Acta Zoologica Lilloana, 38: 59–63.

Gröhn, C. (in press): Einschlüsse im Baltischen Bernstein. – Wachholz Verlag - Murmann Publischers, Kiel / Hamburg, 424 pp.

Killington, F. J. (1936): A monograph of British Neuroptera I. – Ray Society, London, 269 pp.

Meinander, M. (1962): Some Neuroptera from the Madeira and Canary Islands. – Notulae Entomologicae, 42: 79–82.

Meinander, M. (1963): Coniopterygidae (Neuroptera) from Morocco. – Notulae Entomologicae, 43: 92–109.

Meinander, M. (1972): A revision of the family Coniopterygidae (Planipennia). – Acta Zoologica Fennica, 136: 1–357.

Meinander, M. (1975): Fossil Coniopterygidae (Neuroptera). – Notulae Entomologicae, 55: 53–57.

Meunier, F. (1910): Un Coniopterygidae du copal recent de Madagascar (Nevr.). – Bulletin de la Société Entomologique de France, 1910: 164–166.

Nel, A., Perrichot, V. & Azar, D. (2005): New and poorly known fossil Coniopterygidae in Cretaceous and Cenozoic ambers (Insecta: Neuroptera). – Annales Zoologici, Warszawa, 55: 1–7.

Sziráki, Gy. (2009): Data on Coniopterygidae of Argentina with subgeneric division of Parasemidalis Enderlein, 1905. – Folia historico-naturalia Musei Matraensis, 33: 169-199.

Sziráki, Gy. (2011): Coniopterygidae of the world. Annotated check-list and identification keys for living species, species groups and supraspecific taxa of the family. – Lambert Academic Publishing, Saarbrücken, VI + 249 pp.

Tjeder, B. (1957): Neuroptera-Planipennia. The lace-wings of southern Africa 1. Introduction and families Coniopterygidae, Sisyridae, and Osmylidae. – South African Animal Life, 6: 95–188.

György Sziráki
Hungarian Natural History Museum
Baross u. 13.
H-1088 Budapest, Hungary
E-mail: Sziraki@zoo.zoo.nhmus.hu

Carsten Gröhn
Bünebüttler Weg 7.
21509 Glinde, Germany
E-mail: jcgroehn@t-online.de