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The genus *Phaeobalia* Mik, 1881 in Poland (Diptera: Empididae: Clinocerinae)

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Abstract. Data on morphology, biology and distribution of two species of the genus *Phaeobalia* Mik occurring in Poland are presented. A key to species, photographs of wings and male terminalia as well as short ecological and phenological notes are provided. Specimens of this genus deposited in Polish institutional collections were evaluated. New faunistic data for both species: *Phaeobalia inermis* (Loew, 1869) and *Phaeobalia varipennis* (Nowicki, 1868) from the Tatra Mts. are given, including first confirmed records for *P. inermis* since 19th century. Adittionally, *Phaeobalia dimidiata* (Loew, 1861) is excluded from the Polish fauna due to earlier misidentification.

Key words: entomology, faunistics, Clinocerinae, *Phaeobalia*, Poland, distribution, phenology, key to species

INTRODUCTION

The empidid genus *Phaeobalia* Mik, 1881 contains 15 described species (Yang et al. 2007) distributed only in the mountains of central and southern Europe. Ten of them are hitherto known strictly from the Alps, while in the others mountain massifs only a few species occur. Till now exclusively three species were recorded in the Carpathians: *Phaeobalia dimidiata* (Loew, 1869), *P. inermis* (Loew, 1861) and *P. varipennis* (Nowicki, 1868). These species were noted in literature also from Poland. Distribution of most *Phaeobalia* species is apparently restricted to the high parts of the mountains, often above the timber line. All species of this genus occur on wet stones and rocks, small streams and waterfalls, often in areas hard to access for research. For this reason specimens of these flies are scarcely represented in collections.

The knowledge of the genus *Phaeobalia* in Poland was summarized by Niesiołowski (1990, 1992b, 2005). The author gave descriptions, drawings and keys (only for males) for two species: *P. dimidiata* and *P. varipennis*.

The aim of this paper is to present the actual state of knowledge on *Phaeobalia* species known in Poland.

MATERIAL AND METODS

The study is based on the examination of 132 specimens of the genus *Phaeobalia* Mik deposited in the Polish institutional collections. Adults were collected by entomological hand net slightly above the water surface and with tweezers directly from boulders, stones protruding from water, moss overgrowing rocks, etc. Part of the material was preserved in 75% alcohol and some individuals as dry mounted specimens. Descriptions are given based on dried specimens. Terms used for male terminalia primarily follow Sinclair (1995).

The photographs of wings were taken using a Nikon D90 digital camera while pictures of male terminalia using a Nikon E8400 digital camera mounted on Olympus SZX7 stereomicroscope.

Depositories

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Collectors

AK – Andrzej Kownacki, AP – Andrzej Palaczyk, ISK – Iwona Słowińska-Krysiak, SN – Stefan Niesiołowski.

REVIEW OF THE SPECIES OF THE GENUS *PHAEOBALIA* IN POLAND

Phaeobalia inermis (Loew, 1861)

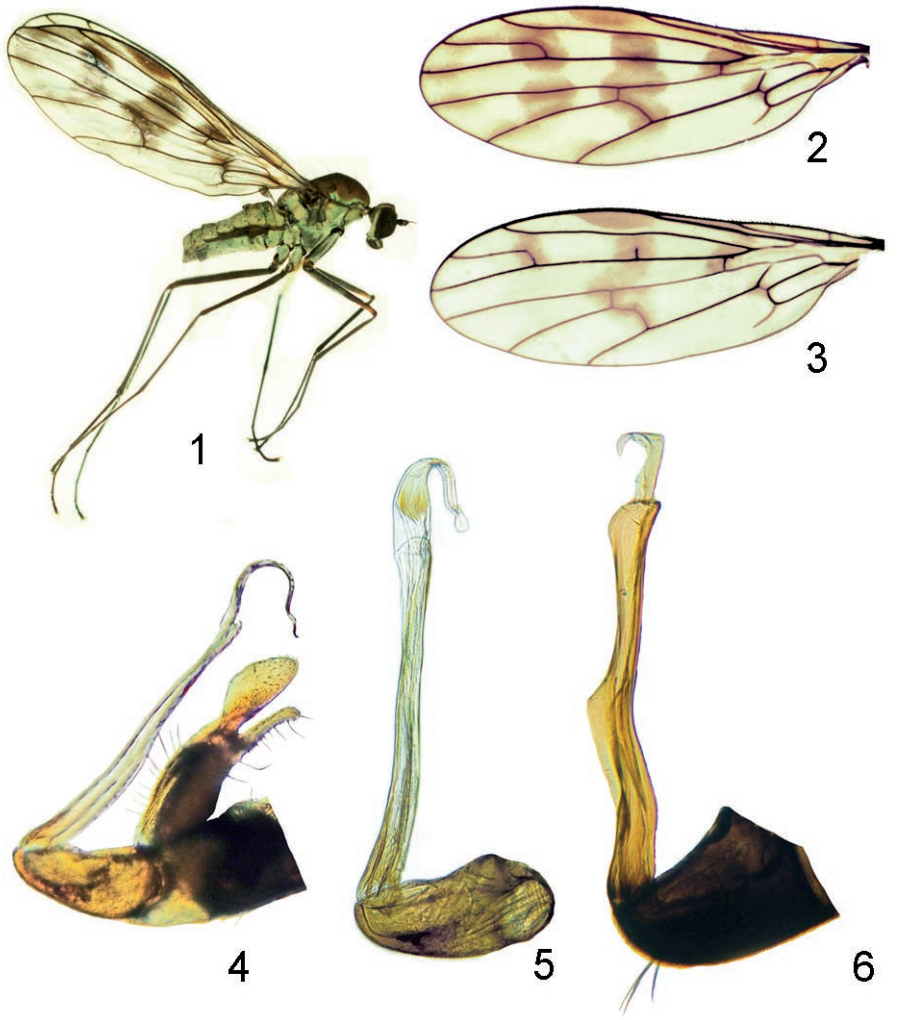
Clinocera inermis Lw.: Nowicki 1865, 1867, 1873; Loew 1870.
Clinocera (*Phaeobalia*) *dimidiata* Loew, 1861: Niesiołowski 1990, 1992b, 2005, 2007 (misidentification).

Material Examined

71 specimens.

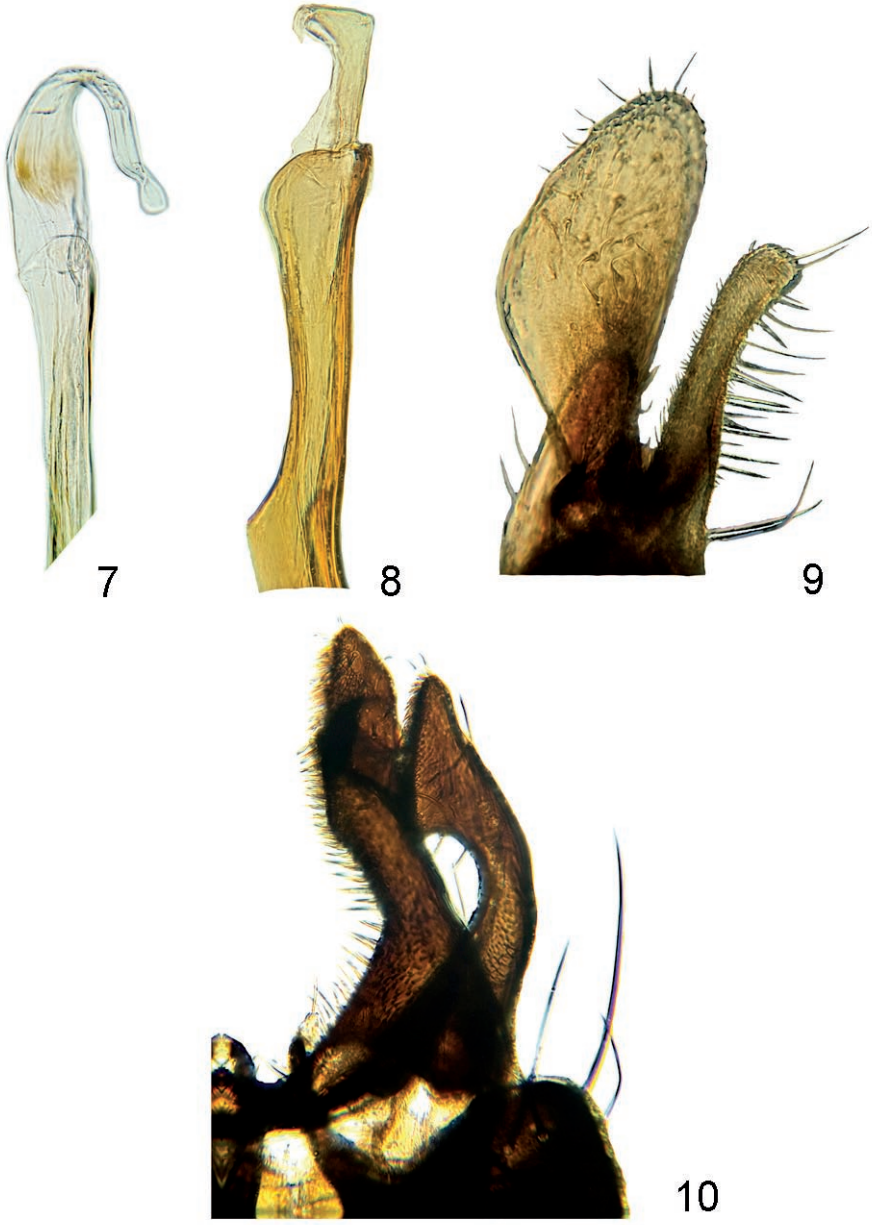
Collection of Nowicki [ZMJU]: 5 females collected in the second half of 19th century, probably from the Tatra Mts. Three of the specimens were originally labelled as *Clinocera inermis* and two were not labelled. Niesiołowski verified that collection and finally identified and labelled all specimens as *C. elapha* Vaillant, 1968.

POLAND, Tatra Mts.: spring near Sucha Woda stream (1550 m), 19 VI 1984, 1♂, 1♀, leg. SN [DIZH]; Sucha Woda stream (1500 m), 14 VII 1987, 9♂♂, 12♀♀, leg. SN [DIZH]; stream below Czarny Staw Gąsienicowy (= Czarny Gąsienicowy Pond) (1600 m), 14 VII 1987, 6♂♂, 8♀♀, leg. SN [DIZH]; spring of Jaworzynka stream (1500 m), 14 VII 1987, 1♂, leg. SN [DIZH] (all specimens identified as *Clinocera dimidiata* Loew, 1869 by Niesiołowski and published by this author in 1990); Jaworzynka stream (1200 m), 7 VIII 2011, 1♂, leg. AP [ISEA], (1150 m), 17 V 2013, 6♂♂, 4♀♀, leg. AP [ISEA], 7♂♂, 1♀, leg. ISK [DIZH], (1130 m), 14 VII 2013, 1♀, leg. AP [ISEA];



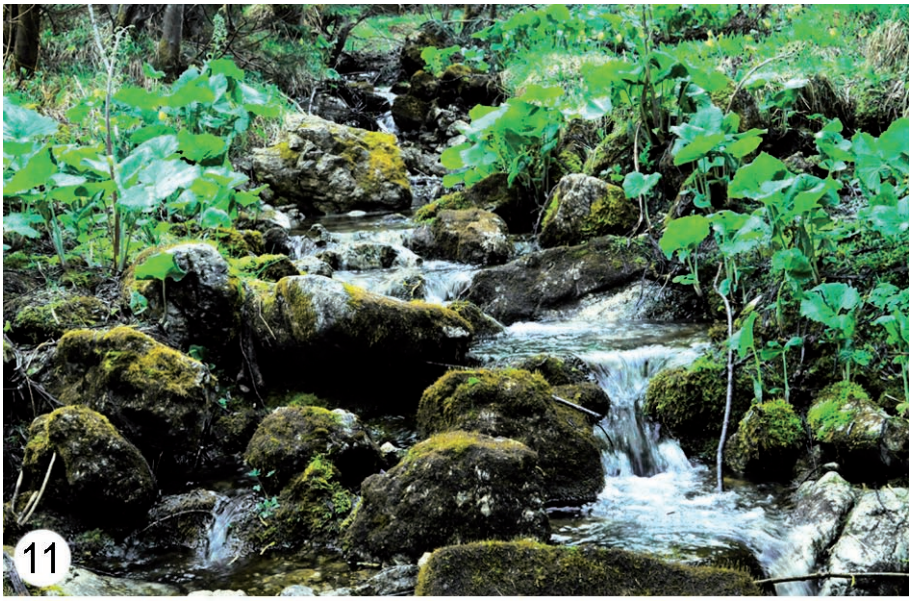
1. Habitus of *Phaeobalia inermis* – female; 2, 3. Wings: 2 – *Phaeobalia inermis*, 3 – *Phaeobalia varipennis*; 4. *Phaeobalia inermis* – hypopygium; 5, 6. Hypandrium and phallus: 5 – *Phaeobalia inermis*, 6 – *Phaeobalia varipennis*

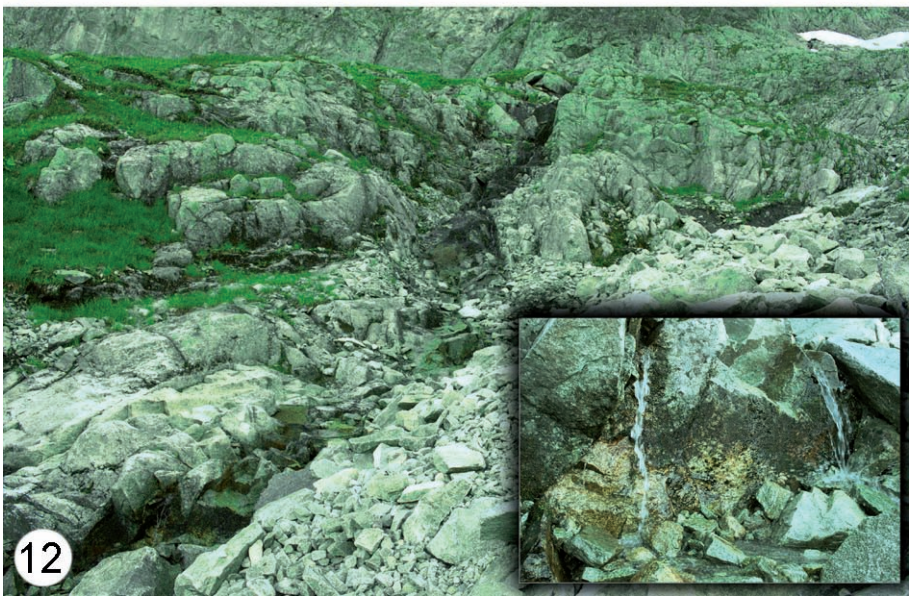
Mnichowy Potok (= Mnichowy Stream) (1650 m), 26 VI 2012, 2♂♂, 2♀♀, leg. AP [ISEA], 24 VI 2013, 2♀♀, leg. AP [ISEA]; spring near Rybi Potok (= Rybi Stream) (1180 m), 23 VI 2013, 1♂, 1♀, leg. AP [ISEA].



7, 8. Apex of phallus with terminal filament: 7 – *Phaeobalia inermis*, 8 – *Phaeobalia varipennis*; 9, 10. Clasping cercus: 9 – *Phaeobalia inermis*, 10 – *Phaeobalia varipennis*

This species was reported from Tatra Mts. only in the second half of the 19th century in the following papers: Nowicki (1865, 1867, 1973) and Loew (1870), but without detailed localities.





11. Tatra Mts., Jaworzynka stream (1200 m) – locality of *Phaeobalia inermis*; 12. Tatra Mts., small brook in Wielki Kocioł Mięguszowiecki (2030 m) – locality of *Phaeobalia varipennis*

MORPHOLOGY

Male: face, gena and occiput with grey pruinescence, frons brown with brown pruinescence. Ocellar triangle black. Bristles on upper half of head, black, stout and long. Lower postocular bristles slender and whitish. Pleura with greyish blue pruinescence, scutum brown with two parallel black vittae in anterior part. In posterior part, above scutellum, long and triangular stripe with greyish blue pruinescence. Acrostichal setulae absent, normally 5 long dorsocentral bristles. Scutellum with grey pruinescence on the entire surface and with two long and strong bristles. Wings distinctly maculated with brown clear spots (Fig. 2). Vein M_1 with large, oval spot below fork R_{4+5}. Halteres with brown stalk and darker knob. Legs dark brown to black. All coxae with greyish blue pruinescence. Fore femora dark brown with light brown apex. Abdomen dark brown to black with greyish blue pruinescence. Posterior parts of tergites with brown pruinescence (dorsal view). Hypopygium as in Fig. 4. Phallus straight (Fig. 5). Terminal

13. Tatra Mts., wet rock in Wielki Kocioł Mięguszowiecki (2080 m) – locality of *Phaeobalia varipennis*

filament (distiphallus) as in the Fig. 7. Lobs of clasping cercus different size. Posterior lob long and wide, anterior lob short and narrow (Fig. 9).

Female: very similar to male (Fig. 1).

Body length: 4.5-5.2 mm; wings length: 5.1-5.8 mm.

Notes of biology.

Adults of this species are encountered on wet and mossy boulders and stones protruding from water (Fig. 11), often with *Clinocera appendiculata* (Zetterstedt, 1838). Sometimes *Phaeobalia inermis* is found also on mossy stones in partly-dried stream-bed.

The flight period extends from the second decade of May to the first decade of August.

General distribution.

Widely distributed in the Alps – Austria, Italy, France, Germany and Slovenia (Engel 1918, 1938-46; Vaillant 1964; Horvat 1995; Wagner & Joost 1999). Engel (1918) reported it from Slovak Tatra Mts. (Barlanliget = Tatranská Kotlina). Chvála & Wagner (1989), Yang et al. (2007) and Chvála (2013) reported this species from Hungary. Unfortunately this record was based on a misinterpretation of 19th century Hungarian's name of locality – Barlanliget. Wéber (1975) in Fauna Hungariae included this species only as expected to be present in Hungary.

Comments

This species was overlooked by Niesiołowski (1990, 1992b, 2005) in his studies of Polish aquatic Empididae (Hemerodromiinae and Clinocerinae), however he reported *Phaeobalia dimidiata* Loew, 1861 from Polish Tatra Mts. as species new for fauna of Poland (Niesiołowski 1990). Unfortunately all specimens were misidentified. These determinations were verified by us herein; the specimens belong to *Phaeobalia inermis*.

In both species males have similar hypopygium, but they differ in others features. *P. dimidiata* is smaller (body length: 3.5 mm; wings length: 4 mm) with indistinctly maculated wings and brown reddish to brown yellowish coxae. Scutellum with grey pruinescence only in the middle part (Loew 1869; Engel 1918, 1939-46). *P. inermis* is larger with clear maculated wings and dark coxae. Scutellum with grey pruinescence on the entire surface.

Until now *P. dimidiata* has not been reported from Slovak part of Tatra Mts. However, in the southern part of Slovak Carpathians this species was noted by Engel (1918, 1938-1946) from Rožňava (= Barcza Roznyo - former Hungarian name in Engel's publications). The occurrence of this species in Poland is probable.

Phaeobalia varipennis (Nowicki, 1868)

Clinocera varipennis Nowicki, 1868b – Tatra Mts. (locus typicus).
Clinocera varipennis Now.: Nowicki 1868a, 1873; Loew 1869, 1870; Engel 1918, 1938.

Clinocera (*Phaeobalia*) *varipennis* Nowicki: Niesiołowski 1990, 1992a, 1992b, 2005, 2007.
Clinocera (Phaeobalia) elapha Vaillant, 1968 – Wodogrzmoty Mickiewicza, Tatra Mts. (locus typicus).

Material Examined

61 specimens.

Collection of Nowicki [ZMJU]: 24 specimens collected in the second half of 19th century probably from the Tatra Mts. Niesiołowski verified these determinations and finally identified and labelled all specimens as *Clinocera elapha* Vaillant, 1968. One of them originally labelled by Nowicki as *Clinocera varipennis* n. sp. has been designated by Niesiołowski (1992a) as lectotype of *C. varipennis* Nowicki, but he did not add the original designation label.

POLAND, Tatry Mts.: Dolina Za Mnichem (= Za Mnichem Valley) (1800 m), 15 X 1978, 1♂, leg. AK [DIZH] (Niesiołowski 1990, 1992b), (1840 m), 3 VIII 2013, 2♀♀, leg. AP [ISEA]; stream below Zmarzły Staw (= Zmarzły Pond) (1650 m), 14 VII 1986, 1♂, 2♀♀, leg. SN, 15 VIII 1986, 1♂, leg. SN [DIZH] (Niesiołowski 1990, 1992b); a damp rocky wall in the Dolina Roztoki (= Roztoka Valley, 19 IX 1985, 2♂♂, leg. SN [DIZH] (Niesiołowski 1990, 1992b); Zadnia Galeria Cubryńska (2070 m), 2 IX 2005, 5♂♂, 6♀♀, leg. AP [ISEA]; Wielki Kocioł Mięguszowiecki (Bandzioch) (1900 m), 3 IX 2005, 1♂, leg. AP [ISEA], 2 VIII 2013, 2♂♂, 5♀♀, leg. AP [ISEA], (2030 m), 2 VIII 2013, 1♂, 2♀♀, leg. AP [ISEA], (2080 m), 2 VIII 2013, 2♂♂, 4♀♀, leg. AP [ISEA].

This species was recorded from Tatra Mts. in the second half of the 19th century in the following papers: Nowicki (1868b, 1973) and Loew (1869, 1870), but without detailed localities. Only Nowicki (1868a) reported it from western slopes of Wołoszyn Mount and Mięguszowiecka Pass (probably actual name is "Pod Chłopkiem" Pass). This species was reported again from the Polish part of Tatra Mts. by Niesiołowski (1990, 1992a, 1992b, 2005) and Klasa & Palaczyk (2010).

In the last century Vaillant (1968) described *Clinocera (Phaeobalia) elapha* from Wodogrzmoty Mickiewicza waterfall based on one male. The species is considered a junior synonim of *Clinocera varipennis* (Niesiołowski 1992a).

Morphology

Male: Chetotaxy and pruinescence of head similar to *P. inermis*. Pleura with greyish blue pruinescence, scutum brown greyish, in anterior part with two black vittae slightly divergent before pronotum. In posterior part, above scutellum, long and triangular stripe with greyish blue pruinescence. Acrostichal setulae absent, normally 5 long dorsocentral bristles (exceptionally 6). Scutellum with greyish pruinescence on the entire surface and with two long and strong bristles. Wings light brown maculated, vein M_1 without spot below fork R_{4+5} (Fig. 3). Halteres dark brown. Legs dark brown to black. All coxae with greyish blue pruinescence. Abdomen dark brown to black with greyish blue pruinescence. Hypandrium broadly triangular, phallus slightly bent with protuberance in the middle part (Fig. 6). Terminal filament (distiphallus) as in the Fig. 8. Both lobs of clasping cercus long, curved and similar length with flattened apex (Fig. 10).

Female: Similar to male.

Body length: 4.4-5.0 mm; wings length: 4.9-5.4 mm.

Notes of biology

In Tatra Mts. *Phaeobalia varipennis* is restricted to high altitudes between 1650 m and 2080 m. Only one male is known from lower elevation and was collected at 1200 m by Vaillant (1968) in Wodogrzmoty Mickiewicza waterfall.

This species is encountered on wet rocks (Fig. 13) and stones and in small, high gradient brooks (Fig. 12) above timber line, sometimes with *C. appendiculata* and *Wiedemannia beckeri* Mik, 1889.

The flight period extends from the first decade of August to the second decade of October.

General distribution

Most records are from Polish and Slovak Tatra Mts. (e.g.: Nowicki 1868a, 1868b; Niesiołowski 1992a, 1992b; Straka 1984). Moreover it is reported in Austrian part of Alps (Strobl 1893) and Italian part of Alps (Pusch & Wagner 1993).

IDENTIFICATION KEY TO THE SPECIES OF *PHAEOBALIA* OCCURRING IN THE CARPATHIANS

1. Vein M_1 with large, oval spot below fork R_{4+5} (Fig. 2). Lobs of clasping cercus different size. Posterior lob long and wide, anterior lob short and narrow (Fig. 9) ……..…… 2.
-. Vein M_1 without spot (Fig. 3). Both lobs of clasping cercus long, curved and similar length (Fig. 10) .....*Phaeobalia varipennis*
2. Coxae reddish yellow with grey pruinescence, other parts of legs reddish brown to yellowish brown, scutellum with grey pruinescence only in the middle part. Wings indistinctly maculated with light brown spots. Smaller species (body length: 3.5 mm; wings length 4.0 mm) .....*Phaeobalia dimidiata*
-. All part of legs dark brown to black with grey pruinescence, scutellum with grey pruinescence on the entire surface. Wings distinctly maculated with brown, clear and dark spots (Fig. 2). Larger species (body length: 4.5-5.2 mm; wings length: 5.1.5.9 mm) ……....*Phaeobalia inermis*

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