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## Bohemian March-flies (Diptera, Bibionidae) in The National Museum, Prague

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Even though the March-flies are frequently collected because of their awkwardness and their abundance, and in spite of the fact that all the species of this family have an economic importance, in our dipterological literature there are not many papers dedicated to the study of the family Bibionidae. Horník & Nolč (1931), Robek (1930) and Baudyš (1913) studied the phytopathological importance of the species *Bibio marci* (L.) and *B. hortulanus* (L.), Uzel (1908) also mentions the damage done by Bibionid larvae. Vimmer (1911, 1925) has dealt with the larval morphology of several species. The distribution of the family Bibionidae as a member of the order Diptera in Czechoslovakia, was dealt with in the papers of Kowarz (1894), Thalhammer (1899), Landrock (1908), Czižek (1908), Brancsik (1910), Vimmer (1913) and Fekete (1914). Two papers by Loew (1870) and Bobek (1890) are of the same kind and deal with the dipterous fauna of the Polish part of the Tatra Mountains and are, therefore, of importance for the study of Slovakian Diptera. Recently, especially from the faunistic point of view, this family has been investigated by Pecina (1962, 1965a, b, c). The monograph of Duda (1930), the works of Séguy (1940) and Enderlein (1936) and the rather antiquated work of Schiner (1864) are of fundamental significance for the systematics, bionomy and ecology of the Bibionidae of Central Europe, besides a number of less-extensive publications on European and palaeartic March-flies. In Czechoslovakia, Vimmer (1931) studied the biology of several species of this family.

The economic importance of Bibionid larvae is really great and is based on the fact that all the organic remains in the soil and on its surface are very quickly transformed into humus by the phytosaprophagous larvae of Bibionidae. The destruction of forest litter is largely brought about by the larvae of Bibionidae. Besides the formation of the soil itself, Bibionid larvae contribute to the aeration of soil. The larvae of the subfamily Bibioninae, which live in numerous colonies containing a large number of individuals, are a significant food component for insectivorous birds and feathered game. The imagines, during their mas-

sive occurrence, may serve as carriers of pollen especially of Umbelliferae and fruit-trees.

The damage done by the larvae reported in many works of phytopathological character which were published in Central and Western Europe and also in North America in the thirties of this century as well as some earlier solitary papers, is occasional and brought about by scarcity of food. In most cases, a considerable number of larvae which have been introduced with manure to the field, start to feed on fine particles of living vegetables, owing to the scarcity of organic remains. The majority of eurytopical and prairie species were considered to be fields pests. After the year 1930, the phytopathological literature began to write about the "new pest of sugar-beet and spring-corn". Nevertheless the case of damages caused by Bibionid larvae need not be taken into consideration at the present, this anachronism of data on injurious Bibionidae appears in the majority of handbooks of agricultural entomology. Bibionid larvae are very susceptible to all fertilizers and that is why their occurrence has recently been made entirely impossible in field cultures.

Up to this time, 19 species of family Bibionidae have been found in Czechoslovakia, of this number 17 species are found in Bohemia. All these species are represented in the collections of the National Museum. In this paper the author presents a list of the Bohemian species, which are deposited in the National Museum in Prague, compares their localities with the older data and characterizes the species from the ecological and phenological point of view. He takes this opportunity to express his thanks to Dr. J. Moucha, CSc., for having kindly placed the material of the National Museum at his disposal.

In consequence of the considerable diversity of stylization of data on the localities, the author was obliged to arrange their wording uniformly. The abbreviation "coll." designates the specimens from the collection of Vimmer only; this collection is kept in its original arrangement among the material of Diptera in the National Museum. If there are abbreviations of other collector's collections mentioned the abbreviation "igt." is used instead of "coll." The months are marked with Roman ciphers, the German names of localities are translated. For example: the data "Mader, 8. 9. 82, coll. Šeda" of male specimen from the collection of Vimmer has been re-designated by the author in the following way: "Modrava (Mader), 8. IX. 1882, igt. Šeda, coll. Vimmer". On the other hand, the designation "igt. Vimmer" is used only, as far as the respective specimen was designated "coll. Vimmer", but it had not been arranged in the collection of Vimmer. This form of designation makes it possible to distinguish the specimens determined by Vimmer and deposited in his collection, which served as the basis of his works. The older literary data documented with the captures and the localities of recent captures which are given in the literature, are marked with an exclamation mark.

THE SURVEY OF SPECIES

PLECIINAE

**Penthetria** Meigen, 1803

**P. holosericea** Meigen, 1818

A species inhabiting moist soils with the mouldering remnants of vegetables, without special requirements of height above sea level. It is most commonly found on the banks of bodies of water where the larvae develop under the litter of deciduous trees, especially of alders and poplars, or in moist meadows. The appearance of the imagines begins in the middle of April and is over in the middle of May; they may also be found singly later. The larvae of this species live solitarily in the soil, in contradistinction to the larvae of the subfamily Bibioninae.

Lit.: Vimmer (1913) stated these data: Dr. Vávra lgt., Kačlehy, Černé jezero in the Šumava Mountains. V. Závist!, cís. r. Veselý. Vimmer took *P. holosericea* for an "inhabitant of places in high altitudes", i. e. for a mountain species.

Material: Bojov pr. Praha, 1 ♂, 2 ♀♀, V., lgt. Vimmer; Bystrice pr. Mladé Buky, (Klinge), 7 ♂♂, 3. V. 1936, lgt. Kl. Spaček; Károv, 3 ♂♂, V., lgt. Nickerl; Kamenice, 1 ♂, 3 ♀♀, V., lgt. Vimmer; Krč near Praha, 3 ♂♂, 3 ♀♀, 2. V. 1890, lgt. Klapálek; Krušovice, 4 ♂♂, 12. V. 1955; Libice pr. Dobříš, 1 ♂, 1 ♀, V., lgt. Vimmer; Lnáře, 5 ♂♂, 4 ♀♀, V., lgt. Vimmer; Modrava (Mader), 1 ♂, 3 ♀♀ 24. VI. 1867, lgt. Šeda, coll. Vimmer; Modřany, 3 ♂♂, 1 ♀, lgt. Čepelák; Muchovice, 1 ♀, VI., lgt. Vimmer; Pyšely, 1 ♂, 1 ♀, VI., lgt. Vimmer; Říčany, 3 ♀♀, VI., lgt. Vimmer; Struhařov, 1 ♀, 1 ♂, lgt. Vimmer; Suchdol pr. Praha, 2 ♂♂, 1 ♀, 11. V. 1957, lgt. Bouček; Veltrusy, 2 ♂♂, 1 ♀, V. 1927; Vinoř, 2 ♂♂, lgt. Vimmer; Vrané, 3 ♂♂, 2 ♀♀, V.; dtto, 3 ♂♂, 1 ♀, 20. III. 1927, lgt. Rambousek; dtto, 1 ♂, 1 ♀, IV., lgt. Vimmer; dtto, 2 ♀♀, 5. IV., lgt. Vimmer, coll. Vimmer; Vůznice, 1 ♂, V., lgt. J. Obenberger; Závist!, 1 ♂; dtto, 2 ♂♂, 6. V. 1923, lgt. Rambousek; dtto, 1 ♂, 9. V. 1907, lgt. Vimmer, coll. Vimmer; Zbraslav, 1 ♀, 10. V. 1940, lgt. Čepelák.

BIBIONINAE

**Philia** Meigen, 1800

**P. febrilis** (Linné, 1758)

One of our most frequent species of the family, more or less eurytopical. This species is common in low-lying lands as well as in the high mountains. Ségy (1940) stated that it also occurred in the Scandinavian mountains higher than 2000 m above sea level. In our conditions, also, *P. febrilis* appears above the upper tree-line.

The flight period is in spring from the middle of April—May, and in autumn in August and September. The interval between the two flight periods is shorter in the higher localities, so that the suggestion of two cycles during one year does not seem likely to be true. There are probably two populations of this species which are morphologically uniform but in which there are different flight periods. The author has not succeeded hitherto in acquiring convincing arguments to support this idea.

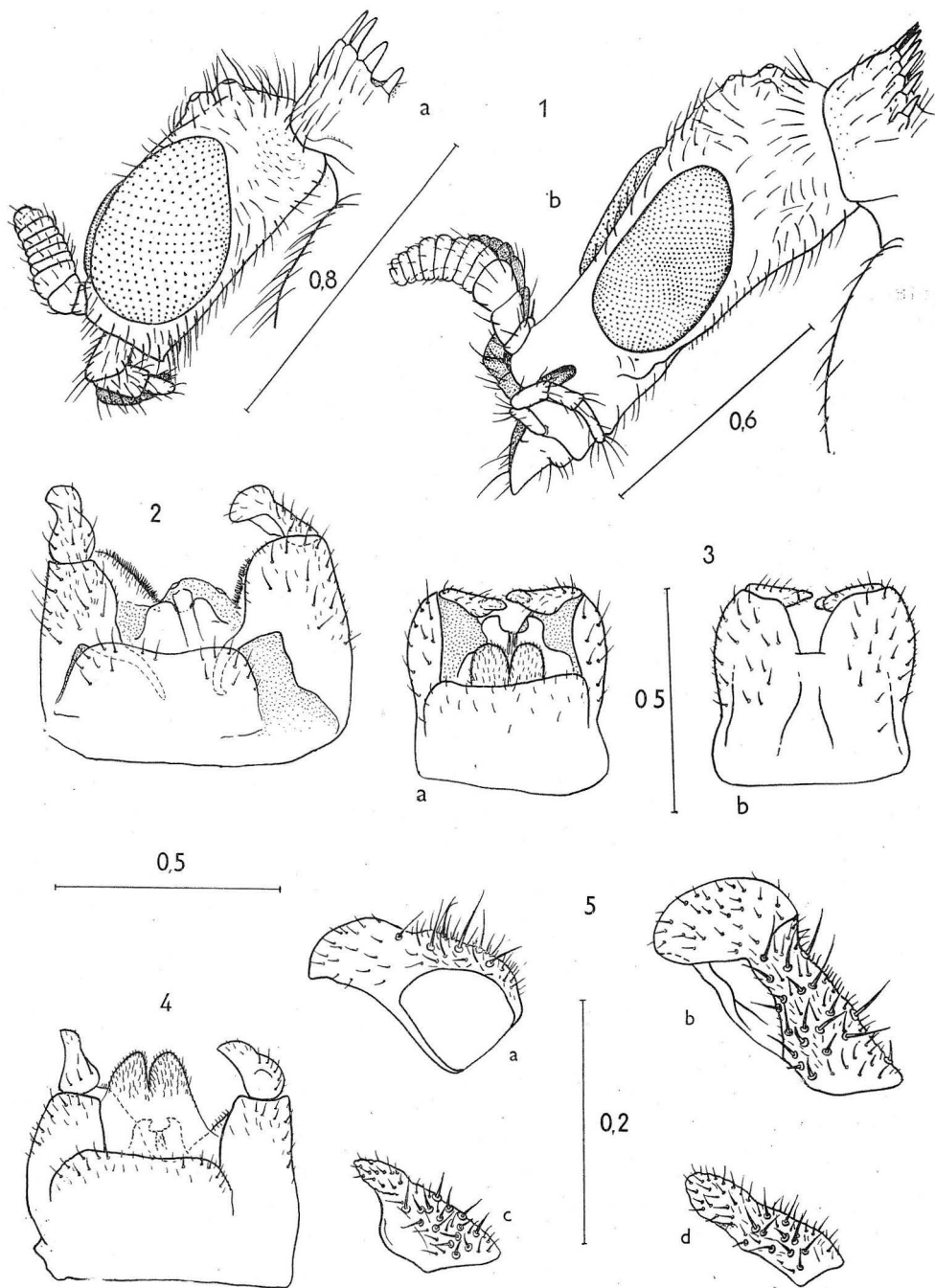


Fig. 1. a) *Philia humeralis* (Zett.), b) *P. femorata* Meig.; head of female laterally.  
 Fig. 2. *Philia femorata* Meig., male hypopygium dorsally.  
 Fig. 3. *P. humeralis* (Zett.), male hypopygium, a) dorsal view, b) ventral view.  
 Fig. 4. *P. febrilis* (L.), male hypopygium dorsally.  
 Fig. 5. Right harpago dorsally: a) *P. febrilis* (L.), b) *P. femorata* Meig., c) *P. humeralis* (Zett.), d) harpago of the other specimen of this species in another position.

It is necessary to prepare the male genitalia in order to correctly determine the species of the genus *Philia*. The author gives figures of distinguishing characters on the head of the females and on the male hypopygia, even though the hypopygia have already been figured and described by Lundström (1913) and Mikołajczyk (1962).

Lit.: Kowarz (1894) reported this species from Bohemia under the synonym *Dilophus vulgaris* Mg. Vimmer (1913): VI., VII., VIII., in the north-eastern and south-eastern Bohemia, common on Umbelliferae. Omnipresent. Česká Třebová!, Lanškroun, Žamberk, Skalice, Hradec Králové.

Material: Česká Třebová !, 1 ♂, 3 ♀♀, 14. VIII.; Dvoračky, Krkonoše, 2 ♂♂, 10. VII. 1946, lgt. Šlengrová; Houška, 1 ♀, 1902, lgt. Vimmer; Cheb, 1 ♂, lgt. Duda, coll. Vimmer; dtto, 2 ♀♀, 5. V. 1878, lgt. Gradl, coll. Vimmer; dtto, 2 ♀♀, 15. V. 1878, lgt. Gradl, coll. Vimmer; dtto, 1 ♀, 1. VI. 1877, lgt. Gradl, coll. Vimmer; dtto, 2 ♀♀, 1. IX. 1882, lgt. Gradl, coll. Vimmer; dtto, 3 ♂♂, 4 ♀♀, 8. IX. 1882, lgt. Gradl, coll. Vimmer; dtto, 1 ♂ incorrectly determined as *Biblio johannis* (L.), lgt. Gradl, coll. Vimmer; Chuchle pr. Praha, 2 ♂♂, V., lgt. Vimmer; Karlštejn, 1 ♀, lgt. Binder; Kralupy, 1 ♀, IX. 1928; dtto, 1 ♀, 16. IX. 1928; dtto, 2 ♀♀, 26. V. 1932; Lovoš pr. Lovosice, 1 ♀, 22. V. 1956, lgt. Bouček; Petrov pr. Jílové, 1 ♂, 1 ♀, 18. VIII. 1918, lgt. Binder; Poddubí pr. Říčany, 1 ♂, 20. VIII., lgt. Vimmer; Praha-Vokovice, 1 ♀, 18. VIII., 1930, lgt. Binder; Protivín, 1 ♂, 1 ♀, VIII. 1902, lgt. Vimmer, coll. Vimmer; dtto, 1 ♂, 29. VIII. 1902; Příbram, 1 ♀, lgt. Šípek; Studničná hora (Brunnberg), Krkonoše, 1 ♀, 28. V. 1933, lgt. Kl. Špaček, 1520 m on snow; Sukdol pr. Kutná Hora, 1 ♀, 16. V. 1927, lgt. Binder; Svádov (Schwaden), 3 ♂♂, 4 ♀♀, lgt. E. Pawlik; dtto, 1 ♀, 18. V. 1943, lgt. Pawlik; dtto, 2 ♂♂, 1 ♀, 28. V. 1944, lgt. Pawlik; dtto, 3 ♀♀, 3. VI. 1944, lgt. Pawlik.

### **P. femorata** (Meigen, 1804)

This species is in all probability an eurytopical and monticolous one. Its flight period, as in the other mountain species, is retarded until summer and prolonged, so that it continues from May to the end of July. According to Séguy (1940), *P. femorata* occurs up to 2200 m a. s. l.

Lit.: Kowarz (1894) described this species under the synonym *Dilophus albipennis* Mg. from Bohemia. Vimmer (1913) reported the flight period as taking place IV.—VIII., and the localities Protivín and Velešín.

Material: Doupov, 1 ♂ misidentified as *P. febrilis*, V., lgt. Vimmer, coll. Vimmer; Lány, 1 ♂, VI., lgt. Vimmer; Modrava (Mader), 1 ♀ erroneously determined as *P. humeralis* (Zett.), 24. VI. 1867, lgt. Šeda, coll. Vimmer; Svádov, 1 ♀, 10. III. 1935; Trutnov, 1 ♀, 1935; Železná Ruda (Eisenstein), 1 ♂ misidentified as *febrilis* (L.), 13. VI. 1867, lgt. Šeda, coll. Vimmer.

### **P. humeralis** (Zetterstedt, 1850)

This species is very rare in Czechoslovakia. According to older descriptions the males of this species are nearly indiscernible from *P. antipedalis* (Meig.), 1818. Owing to the scarcity of material it is not possible to make any conclusions as to the flight period, the ecological requirements and the vertical or horizontal distribution of this species.

*P. humeralis* (Zett.) is new to the fauna of Bohemia. In the collection of Vimmer there is 1 female of *P. femorata* erroneously determined as

*humeralis* (Zett.). In the material of the National Museum in Prague a single male specimen of *P. humeralis* is deposited and the locality designated "Praha—Vořechovka, 30. III. 1927, lgt. Rambousek".

### **Bibio** Geoffroy, 1764

#### **B. venosus** (Meigen, 1804)

Rare species, occurring, according to literature, in deciduous forests especially in beech-groves. Flight period in May.

Vimmer (1913) states: V., VI., Central Bohemia; Královské Vinohrady (= a quarter of Prague), park. The data of Vimmer are not correct so that it is not impossible to consider this species to be a new one to Bohemia. In the collection of Vimmer there are no specimens proving his data. In view of the fact that Vimmer recorded this species from Prague, the flies were probably incorrectly determined, because *B. nigriventris* Hal. is the only small species which occurs in the parks of large towns. In the material of the National Museum there is 1 male labelled "V. Frič in Prague", probably from Bohemia, and 1 female misidentified as *reticulatus* (Loew) from Vrané pr. Praha, 5. VII., lgt. Vimmer, coll. Vimmer.

#### **B. leucopterus** (Meigen, 1804)

*B. leucopterus* is also a rare species, occurring in deciduous forests. It is new to the list of Bohemian Bibionidae. The data on its occurrence in Moravia and Slovakia were published by Pecina (1965a, c).

Material: Svádov (Schwaden), 1 ♀, 30. V. 1944, lgt. Pawlik; dtto, 1 ♀, 10. VI. 1935.

#### **B. hortulanus** (Linné, 1758)

Common in low-lands, thermophilic, eurytopical species which may be injurious to field cultures and gardens according to older data. In Czechoslovakia it is common everywhere, except in the mountains. It is very rare in the montane zone and found at localities with optimum conditions only. The flight period is in May—June, with its maximum at the end of May, but the time-interval of captures is longer. *B. hortulanus* occurs in Czechoslovakia in the fields and meadows, rarely at the edge of forest, the larvae develop in forest litter also only exceptionally. They may occasionally be coprophagous according to the paper of Leclercq (1954). The species is probably a steppe-element of our fauna.

Lit.: Kowarz (1894) and Vimmer (1913) described this species as a frequent one everywhere in Bohemia, the latter author stated the flight period to take place in April—June.

Material: Běchovice, 1 ♀, 16. V. 1918, lgt. Binder; Černošice, 1 ♀, 26. V., lgt. Vimmer; Dobřív pr. Rokycany, 1 ♀, VII., lgt. Vimmer; Dubí, 1 ♂, VI. 1935; Holín, 1 ♀, 28. V. 1904; Hostivař, 2 ♀♀, V. 1953, lgt. Pádr; Cheb, 1 ♀, 6. IX. 1875, lgt. Gradl, coll.



Vimmer; Chuchle, 1 ♂, V., lgt. Vimmer; Kaménice, 1 ♂, VI., lgt. Vimmer; Kařez, 2 ♂♂, 1 ♀, 9. VI. 1931, the garden of the house no. 10 on Umbelliferae; dtto, 1 ♂, 16. VI. 1936, Kařizecké hory, swept on the forest clearing; Kralupy, 1 ♂, 1 ♀, V. 1925; dtto, 1 ♀, V. 1933; Krč pr. Praha, 2 ♀♀, 24. V. 1906, coll. Kheil; Lesná, 1 ♀, 19. V. 1911; Libiš, 1 ♀, V. 1918; Lobeček pr. Kralupy, 4 ♂♂, 3 ♀♀, V. 1928; Modřany pr. Praha, 1 ♂, 4. VIII. 1918, lgt. Binder; Mokropsy, 1 ♀, 5. V. 1918, lgt. Binder; Mušice, 1 ♂, 1 ♀, V. 1918; Nehvizdy, 3 ♂♂, 2 ♀♀, 25. V. 1951, lgt. et det. J. Mařan; Písek, 1 ♀, 2. VI. 1930, lgt. Tábořský; dtto, 3 ♀♀, 11. VI. 1930, lgt. Tábořský; dtto, 1 ♂, 2 ♀♀, 17. V. 1930, lgt. Tábořský; Poddubí, 1 ♂, 1 ♀, V., lgt. Vimmer; Poděbrady, 1 ♀, lgt. Vimmer; Praha-Cibulka, 1 ♀, 4. VI. 1893, lgt. Klapálek; Praha-Grábovka, 1 ♀, 1908, lgt. Vimmer; Praha-Pelc-Tyrolka, 2 ♂♂, VI., lgt. Vimmer; Praha-Podbaba, 1 ♂, V., lgt. Vimmer; Příbram, 1 ♀, lgt. Sípek; Radim, 1 ♂, 4. IV. 1899, lgt. Vimmer; Radotín, 2 ♂♂, lgt. Vimmer; Říčany, 1 ♀ erroneously denoted as *siculus* Lw., VI., lgt. Vimmer; Stránčice, 1 ♂, VI., lgt. Vimmer; Staré Buky pr. Trutnov (Altenbuch b. Trautenau), 1 ♂, lgt. K. Špaček; Svádov (Schwaden), 2 ♂♂, 1 ♀, lgt. E. Pawlik; dtto, 1 ♂, 1 ♀, 21. V. 1945; Svatý Prokop pr. Praha, 1 ♂, 13. VI. 1891, lgt. Klapálek; Tábor, 1 ♀, lgt. Hlava, coll. Vimmer; Toušeň pr. Brandýs n. L., 1 ♀, 31. V. 1904, lgt. Lokay; Trutnov, 1 ♂, 5 ♀♀, lgt. Kl. Špaček; Úpice (Eipel), 4 ♀♀, 13. VI. 1935, lgt. Kl. Špaček; dtto, 1 ♂, 1 ♀, 15. VI. 1935, lgt. Kl. Špaček; dtto, 1 ♀, 16. VI. 1933, on *Crataegus*, lgt. Kl. Špaček; dtto, 1 ♂, 17. VI. 1934, lgt. Špaček; dtto, 3 ♀♀, 1934, lgt. Špaček; Zátíší, 1 ♂, V. 1923; Zlíchov pr. Praha, 1 ♂, 3 ♀♀, 22. V. 1898, coll. Vimmer.

### *B. marci* (Linné, 1758)

This very common species is closely related to *B. hortulanus*, so that it was considered by Duda (1930) as a mere subspecies of *hortulanus* (L.). *B. marci* is, however, a distinct species if on no other account than because the flight of both species takes place in the same season and often in the same biotops without any interbreeding. This species was also mentioned to be an occasional pest. This is more frequently so in afforested areas and the larvae are common in tree-litter, in contradistinction to *B. hortulanus*, even though *B. marci* is also an eurytopical species. It also occurs higher up in the mountains. The massive appearance of *B. marci* begins in Bohemia about two weeks earlier than that of *B. hortulanus* and it is also sooner over. The Czech name, "muchnice březnová" (březen = March, in English March-fly), is not appropriate, because this species appears massively, at the earliest, before the middle of April. The specific name "*marci*" has its origin in the day of St. Marcus, which falls on the 25th April, just at the period of maximal occurrence.

Lit.: Kowarz (1894) reported *B. marci* from Bohemia and Vimmer (1913) considered it to be omnipresent, with the flight period in March—June.

Material: Dobříš, 1 ♂, 9. V. 1933, on a twig of larch in a young forest near a sand-stone quarry; Františkovy Lázně (Franzensbad), 1 ♂, lgt. F. Kowarz, coll. Vimmer; Horní Bříza, 1 ♂, V., lgt. Vimmer, coll. Vimmer; Hradec Králové, 1 ♂, 19. VI., lgt. Uzel, coll. Vimmer; dtto, 1 ♀, 23. VI. 1904, lgt. Uzel, coll. Vimmer; Cheb, 1 ♂, 23. V. 1883, lgt. Gradl, coll. Vimmer; dtto, 1 ♀, V. 1876, lgt. Gradl, coll. Vimmer; dtto, 2 ♂♂, 1 ♀, 22. V. 1879, lgt. Gradl, coll. Vimmer; dtto, 1 ♂, 4. VI. 1876, lgt. Gradl, coll. Vimmer; Chuchle pr. Praha, 1 ♂, 22. IV. 1961, lgt. Macek; Jindřichův Hradec, 2 ♂♂, 3. V., lgt. Duda, coll. Vimmer; Karlův Týn, 1 ♂, V., lgt. Čepelák; dtto, 1 ♀, V., lgt. Čepelák; Kařez, 1 ♂, 8. V. 1934, swept on the grass and vegetables of a garden; Kralupy, 2 ♂♂, V. 1930; Krč pr. Praha, 1 ♂, 1 ♀, 29. IV., lgt. K. Zeman; Libiš pr. Mělník, 2 ♂♂, 19. V. 1918; Lobeček pr. Kralupy, 1 ♀, V. 1928; Lovoš pr. Lovosice, 1 ♂, 22. V. 1936; Mokropsy, 1 ♀, 5. V. 1918, lgt. Binder; Mstětice pr. Čelákovice, 1 ♂, 1 ♀, VI., lgt. Vimmer; Nebušice pr. Praha, 2 ♂♂, V., lgt. Vimmer; Nová Paka, 1 ♂, 28. V. 1955,

lgt. J. Moucha; Písek, 1 ♀, 17. V. 1930, lgt. Tábořský; Poddubí, 1 ♂, 1 ♀, V., lgt. Vimmer; Popovice, 1 ♀, VI., lgt. Vimmer, coll. Vimmer; Praha-Bellvedere, 1 ♂, lgt. Nickerl, coll. Vimmer; dtto, 1 ♂, lgt. Nickerl; Praha — environs, 5 ♂♂, lgt. Čepelák; Praha-Hlubočepy, 1 ♀, lgt. Čepelák; Praha-Košíře, 1 ♀, 23. V. 1911; dtto, 1 ♂, V., lgt. Vimmer; Praha-Letná, 1 ♂, V., lgt. Vimmer; Praha-Troja, 2 ♂♂, 10. IV. 1953, lgt. Pádr; Praha-Vinohrady, 1 ♀, VI. 1904, lgt. Vimmer; Příbram, 1 ♂, 1 ♀, lgt. Šípek; Radotín, 1 ♀, 6. V. 1906, lgt. Uzel, coll. Vimmer; Řevnice, 1 ♀, 10. V. 1964, lgt. Macek; Říčany, 2 ♂♂, lgt. Vimmer; dtto, 1 ♂, VI., lgt. Vimmer; Strahov, 1 ♀, 14. V. 1899, coll. Vimmer; Studničná hora (Brunnberg), Krkonoše, 1 ♂, 1 ♀, 28. V. 1933, 1520 m o. s. on snow., lgt. Kl. Špaček; Svádov (Schwaden), 2 ♀♀, lgt. Pawlik; dtto, 2 ♂♂, 1 ♀, 27. IV. 1943, lgt. Pawlik; dtto, 1 ♀, 15. V. 1945, lgt. Pawlik; dtto, 3 ♂♂, 23. V. 1944, lgt. Pawlik; Šárka pr. Praha, 3 ♂♂, coll. Vimmer; dtto, 1 ♂, 2 ♀♀, 8. V. 1940, lgt. Čepelák; Turnov — environs, 1 ♂, V. 1921, lgt. Obenberger; Trutnov, 7 ♂♂, 6 ♀♀, 1933; dtto (Trautenau), environs, 2 ♀♀, VII. 1932, lgt. Kl. Špaček; Úpice (Eipel), 1 ♀, 12. VI. 1935, lgt. Kl. Špaček; Vinoř, 1 ♂, VI., lgt. Vimmer.

### **B. pomonae** (Fabricius, 1775)

Monticolous, i. e., alpine species, which is characteristic of the edges of mountain forests. Larvae develop most often in the litter of beeches and maples. *B. pomonae* is distributed all over Scandinavia and north-eastern Asia and in the mild climatic zone only in the mountains, from whence it spreads even into the hilly countries with montane conditions. Its occurrence southward to the Atlas has been established. The flight period is retarded to July—September, which is the rule in all mountain species of March-flies.

Lit.: Vimmer (1913) mentioned the localities Vápený Podol, Česká Třebová! and Dobřichovice and stated that the flight period took place in VII.

Material: Česká Třebová I, 1 ♀, 19. VIII.; Harrachov, Krkonoše, 3 ♂♂, 1 ♀, VII. 1933, lgt. F. Hájek; Havlovice pr. Úpice, 1 ♀, VII. 1945, lgt. Kl. Špaček; Cheb, 1 ♀, 25. VII. 1878, lgt. Gradl, coll. Vimmer; Krkonoše, 2 ♂♂, VII. 1925; Lenora, Šumava, 1 ♀, VII. 1934, lgt. F. Hájek; Pec - Sněžka, Krkonoše, 7 ♂♂, VII. 1962, lgt. Macek; Rokytná, Krkonoše, 1 ♂, VII. 1963, lgt. Macek; Strašice, 2 ♀♀, 1909, lgt. Vimmer; coll. Vimmer; Svádov (Schwaden), 1 ♂, 1 ♀, lgt. Pawlik; Vápený Podol I, 2 ♀♀, lgt. Vimmer, coll. Vimmer; dtto, 1 ♂, VIII. 1904.

### **B. ferruginatus** (Linné, 1767)

Detailed data on this species were published in the paper of Pecina (1965b). It is a rather rare species. Vimmer (1913) reported the localities Náchod, Česká Skalice, Smíchov (a quarter of Prague), and the flight period in May and June; these data have not been corroborated. In the collection of Vimmer there is a single female of *B. varipes*, which had been incorrectly noted as *B. ferruginatus*. In the material of the National Museum one male *B. ferruginatus*, misidentified as *varipes*, is deposited, with the data Svádov (Schwaden), 30. VI. 1935.

### **B. lanigerus** Meigen, 1818

Very frequent species, dependent on forests, especially deciduous ones. Most often in oak- and elm-groves, the larvae develop in tree litter. In Bohemia, it seems to be the most frequent species, apart from *B. marci*,



autumnal *B. clavipes* and *B. hortulanus*. It practically does not occur in the mountains. The flight period is in May, single individuals may be found at an earlier date or a later one.

The systematic value of var. *hybridus* Haliday is doubtful pending a detailed revision. It may be a mere aberration. Except for the black pilosity of thorax in males of *hybridus* no definite distinguishing characters are given, the hypopygia do not differ. *B. lanigerus* var. *hybridus* appears probably very rarely, which is why it is not possible to determine the flight period and the ecological requirements, if they differ at all from the typical form.

Lit.: Vimmer (1913) reported *B. lanigerus* s. str. from Česká Třebová and Aš. For both the data material evidence is lacking. The author considers this species to be the one described by Vimmer in Bohemia since several correctly denoted specimens from other localities (Františkovy Lázně, Kowarz lgt.) may be found in the collection of Vimmer. As far as var. *hybridus* Hal. is concerned, Kowarz (1894) mentioned its occurrence in Bohemia and these data are evidenced by several specimens deposited in the collections of the National Museum. Vimmer (1913) only took over the data of Kowarz.

Material: *B. lanigerus* Meig. s. str.; Františkovy Lázně (Franzensbad), 1 ♀, 1. V. 1904, lgt. F. Kowarz, coll. Vimmer; dtto, 1 ♂, 6. V. 1904, lgt. Kowarz, coll. Vimmer; Cheb, 1 ♂ misdenoted as *nigriventris* Hal., 15. V. 1885, lgt. Gradl, coll. Vimmer; dtto, 1 ♂ erroneously determined as *nigriventris*, 25. V. 1885, lgt. Gradl, coll. Vimmer; dtto, 2 ♀♀, misdetermined as *B. johannis* (L.), 14. V. 1879, lgt. Gradl, coll. Vimmer; Chvojno — Hradec Králové, 1 ♀ misdenoted as *B. varipes* Meig., IV., lgt. Uzel, coll. Vimmer; Jiřiny nad Labem, 1 ♂, 23. VII. 1913, lgt. Binder; Karlovy Vary (Karlsbad), 1 ♂, 1 ♀ (in copula), 11. V. 1938, lgt. W. Reinhard; Kařez, 1 ♂, 29. IV. 1936, Kařizecké hory, on the bloom of *Salix aurita* in the forest; Kralupy, 1 ♂, V. 1933; dtto, 2 ♂♂, 1 ♀, IV. 1932; Nová Paka, 6 ♂♂, 28. V. 1955, lgt. J. Moucha; Praha-Hvězda, 3 ♂♂, 14. V., lgt. Vimmer.

*B. lanigerus* var. *hybridus* Hal.; Františkovy Lázně (Franzensbad), 1 ♂ determined as *hybridus* Hal. but arranged among the specimens *B. johannis* (L.), lgt. F. Kowarz, coll. Vimmer; dtto, 1 ♂, IV, 1904, lgt. F. Kowarz, coll. Vimmer.

### ***B. reticulatus* Loew, 1846**

Rare species, being scarce in the whole territory. According to Duda (1930) it occurs mostly in beech-groves; also in Czechoslovakia it seems to be a species of leafy forests. The flight period, according to several Czechoslovak captures and to the data of Duda (1930) takes place in the first half of May.

Lit.: Vimmer (1913) stated: VI., leg. Dr. Uzel, Hradec Králové. In his collection there is one female. *B. venosus* (Meig.) from Vrané, erroneously determined as *reticulatus* Loew. The single female specimen from Bohemia, deposited in the collection of the National Museum, was found at Valdek (Waldegg), lgt. Kowarz, coll. Vimmer, misdetermined as *varipes* Meig.

### ***B. varipes* Meigen, 1818**

*B. varipes*, as with both the preceding species, is prevalently a denizen of deciduous forests but it does not avoid those of coniferae.

Schremmer (1958) mentioned the larvae of *B. varipes* from fir-tree litter. I suppose that all three species are typical of querceto- carpinetum and beech-groves. *B. varipes* occurs in the mountains as well. It occurs locally but not frequently throughout Czechoslovakia. Flight period in May.

Lit.: Kowarz (1894) described this species from Bohemia, Vimmer (1913) stated the flight period to take place in V. and VI. and the localities Česká Skalice, Hradec Králové!, Krč!, and Central Bohemia.

Material; Aš (Asch), 1 ♀, V. 1876; Dobříš, 1 ♀, 23. IV. 1954, lgt. Pádr; Františkovy Lázně (Franzensbad), 1 ♂, 22. V. 1879, lgt. Kowarz, coll. Vimmer; Hradec Králové!, 2 ♀♀, lgt. Uzel, coll. Vimmer; Cheb (all the specimens misidentified as *nigrifemur* Hal., lgt. Gradl, coll. Vimmer): 1 ♀, V. 1877, 1 ♀, 7. V. 1878, 5 ♀♀, 15. V. 1878, 1 ♀, 16. V. 1885, 2 ♀♀, 25. V. 1885; Chuchle pr. Praha, 1 ♀ arranged as *ferruginatus* (L.), 11. V., lgt. Vimmer, coll. Vimmer; dtto, 1 ♀, 11. V., lgt. Vimmer; coll. Vimmer; dtto, 3 ♂♂, 1 ♀, V., lgt. Vimmer; Jirny, 1 ♂, 1. V. 1925; Krč pr. Praha!, 1 ♀; dtto, 1 ♀, V., lgt. Vimmer; Kralupy, 1 ♀, V. 1938; Radotín pr. Praha, 1 ♀, 6. V. 1906, lgt. Uzel, coll. Vimmer; Trutnov, 1 ♀, 1933, lgt. Kl. Špaček; Turnov, 1 ♂, V. 1921, lgt. Obenberger; Valdek (Waldeg), 3 ♂♂, 5 ♀♀, lgt. Kowarz, coll. Vimmer.

### ***B. johannis* (Linné, 1767)**

*B. johannis* (L.) s. str. differs in males by black and yellow f from var. *jacobi* Vill., which has the f entirely yellow, and from var. *nigrifemur* Strobl with entirely black f. Male hypopygia have no distinguishing characters. The typical form and var. *jacobi* Vill. often occur together, even in the same population. Probably it is nothing more than a mere abbreviation. On the other hand, var. *nigrifemur* Strobl occurs always isolatedly and predominates in Bohemia, although a single specimen has been determined in material from Moravia but it has not been found in Slovakia. On the strength of this fact the author assumes that var. *nigrifemur* to be a subspecies. As the author has not sufficient evidence to prove this assumption he denotes it with the ambiguous term variety. Var. *nigrifemur* is lacking in the collection of the National Museum in Prague, nevertheless, according to the author's investigations, it is more common in Bohemia than the typical form.

*B. johannis* (L.) s. str. does not differ ecology from either of the varieties. It is an eurytopical species which is a frequent denizen of open places, of meadows and fields; thermophilic, relatively common, occasionally injurious according to some older papers. The flight period takes place in the second half of April and in May, and a little earlier in var. *nigrifemur*.

Lit.: Kowarz (1894) described this species from Bohemia and Vimmer (1913) mentioned that it occurred in May and June in the environs of Prague. In the collection of Vimmer there were 4 species of the genus *Biblio* and 1 male of *Philia febrilis* included under the designation of *B. johannis*.

Material: [*B. johannis* (L.) s. str. and abb. *jacobi* Vill.]: Aš (Asch) (all lgt. Kowarz, coll. Vimmer): 1 ♂, 1 ♀, IV. 1878, 1 ♂, 1 ♀, 27. IV. 1869, 1 ♂, V. 1868, 1 ♂, V. 1873; Džbán 530 m, 2 ♂♂, 29. IV. 1964, lgt. J. Moucha; Františkovy Lázně (Franzensbad), 1 ♂, 5. V. 1879, lgt. Kowarz, coll. Vimmer; Cheb, 2 ♂♂, V. 1877, lgt. Gradl, coll.

Vimmer; dtto, 1 ♂, 6. V. 1878, lgt. Gradl, coll. Vimmer; dtto, 1 ♂, 17. V. 1877, lgt. Gradl, coll. Vimmer; Chocerady, 1 ♂ 13. VI. 1909, lgt. Binder; Kařez, 1 ♂, 6. V. 1936, swept from grass and the blooms of dandelions and daisies in the garden of the house No. 122; Praha-Podolí (Podolia), 1 ♂, lgt. Hanus; Rynholec, 1 ♂, VI., lgt. Vimmer; Valdek (Waldegg), 3 ♂♂, lgt. Kowarz, coll. Vimmer.

### **B. femoralis** Meigen, 1838

The data on this species in Czechoslovakia have already been dealt with by Pecina (1965b). After that paper had been sent for publication, another 3 male and 1 female specimens with the data Svádov (Schwaden), 20. III. 1935, were found in the material of the National Museum.

### **B. clavipes** Meigen, 1818

A common species, especially the form named var. *lepidus* Loew. In spite of single captures of larvae in forest litter, the author considers *B. clavipes* Meig. to be a species of meadows and, probably, a steppe-element. It is distributed everywhere, in the lowlands as well as in the mountains, where it occurs together with the autumnal population of *P. febrilis* (L.). The form denoted as var. *lepidus* Loew differs from the typical form by the presence of dark pterostigma on the wings of males, and the females of var. *lepidus* are brown to black with much shorter legs than the sandy-coloured females of *clavipes* s. str. When studying more extensive material it appears that both these forms are connected, both in males and in females, by a continuous series of forms, and that both the extreme forms and even the transitions may exist among specimens in the same population, i. e., in the same colony. The author has come to foregoing conclusions chiefly when studying the material of this species from two of the Czech mountains ranges of Krkonoše and Šumava. The results of this investigation will be published later. The author does not even consider the var. *lepidus* to be an aberration, and he ascribes, therefore, the differences in colour and size of individuals of *B. clavipes* to the great variability of this species. The reasons which have led to this fluctuation of characters are not known to the author. The variability of the species is reflected also in the fact, that *B. clavipes* proves to be both an autumnal and a vernal species. In South Europe, according to Duda (1930) and Séguy (1940), its flight period takes place twice a year. In our conditions, its flight period begins in the middle of September and is over at the end of October, usually up to the first frosts. In the mountains *B. clavipes* appears as early as August.

Lit.: Kowarz (1894) included *B. clavipes* in his list of Bohemian Diptera, so did Vimmer (1913) and reported the flight period to take place in V. and VI. from Police nad Metují and Broumov. According to the months, it is probable that it has been mistaken for another species, even though a case of finding this species in spring is known from Moravia (Pecina, 1965a).

Material: Aš, 1 ♂, X. 1871, lgt. Gradl, coll. Vimmer; Františkovy Lázně (Franzensbad), 1 ♂, 1 ♀, lgt. F. Kowarz, coll. Vimmer; dtto, 1 ♀, 5. X., lgt. F. Kowarz, coll.

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