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**Autor:** Papp, Laszlo / Haenni, Jean-Paul

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## *Bibio handlirschi* Duda, 1930 (Diptera, Bibionidae) rediscovered and redescribed

LASZLO PAPP<sup>1</sup> & JEAN-PAUL HAENNI<sup>2</sup>

<sup>1</sup> Hungarian Natural History Museum, Department of Zoology and Animal Ecology Research Group of the HAS, Baross u. 13, H-1088 Budapest, Hungary. email: lpapp@nhmus.hu

<sup>2</sup> Muséum d'histoire naturelle, Rue des Terreaux 14, CH-2000 Neuchâtel, Switzerland. email: jean-paul.haenni@unine.ch

After 100 years without any data, *Bibio handlirschi* Duda, 1930 was captured again in Hungary (Budapest, Pestszentlőrinc). The species is redescribed and figured, including the details of the male genitalia, on the base of the study of the male lectotype (Austria). Its occurrence in Greece is recorded for the first time.

Keywords: Diptera, Bibionidae, *Bibio handlirschi*, taxonomy, Austria, Hungary, Greece

### INTRODUCTION

*Bibio handlirschi* Duda, 1930 is one the few very poorly known species among the European Bibionidae. The species was described from «Austria, Hungaria» in the chapter Bibionidae of the monograph «Die Fliegen der palaearktischen Region» (Duda 1930), based on material collected at the end of the 19th century.

Hardy (1967) selected a male lectotype from Austria from the type series deposited in the NHMW and considered the species as valid. *B. handlirschi* is listed as such in the Catalogue of Palaearctic Diptera (Krivoshchina 1986) and in Fauna Europaea (Skartveit 2005). However, the species has never been collected in the last 100 years or so, and no record has been published since the original description.

The original description by Duda (1930) mentioned 2 female syntypes from Hungary «im Ung. Nat.-Mus. 2 ♀♀ K. K. Halas Hung. med. 24.VIII.02». Both females collected in 1902 should have been studied by Géza Zilahi-Sebess in the HNHM Diptera Collection. Unfortunately, when he published the bibionid part of the Fauna Hungariae (Zilahi-Sebess 1960) the two syntypes, together with so many thousands of specimens and types, had been annihilated by the fire in the HNHM in November 1956, so his text was based on his notes and on his memory only. Anyway he included «*Handlirschi* Duda» in his key (which was based on Duda's) with the indication «Kiskunhalasról írták le (V., VII.)», which is a contradiction of date with the labels of the specimens studied by Duda (see also 'Notes on biology and distribution' below). No specimen of the species has been collected after 1956 in Hungary and no other material is preserved in the Diptera Collection of the HNHM. *B. handlirschi* is omitted in the new Checklist of the Diptera of Hungary (Papp 2001) and is erroneously not even mentioned as a dubious species in the introductory notes to the family Bibionidae.

In the last years however, the first author captured in a small forest in a suburb of Budapest specimens of a small-bodied *Bibio* species which would run to *Bibio handlirschi* using the key in Duda (1930).

On the other hand, the second author had tentatively identified as *Bibio handlirschi* material collected at the end of the '70 by Michel Dethier in Greece.

The comparison of the recently collected specimens with the lectotype of *B. handlirschi* from NHMW allows to confirm the identity of this new material. The purpose of the present paper is the redescription and the discussion of this hardly known species.

#### MATERIAL

Material from the following collections has been studied:

- HNHM: Hungarian Natural History Museum, Budapest (recent material from Hungary)
- MHNN: Muséum d'Histoire Naturelle, Neuchâtel (recent material from Greece)
- NHMW: Naturhistorisches Museum Wien (type material from Austria).

When quoting label data, handwritten characters are given in quotation marks; measurements and other data not given on label, or translations are in square brackets.

#### TAXONOMY

##### *Bibio handlirschi* Duda, 1930 (Figs 1–7)

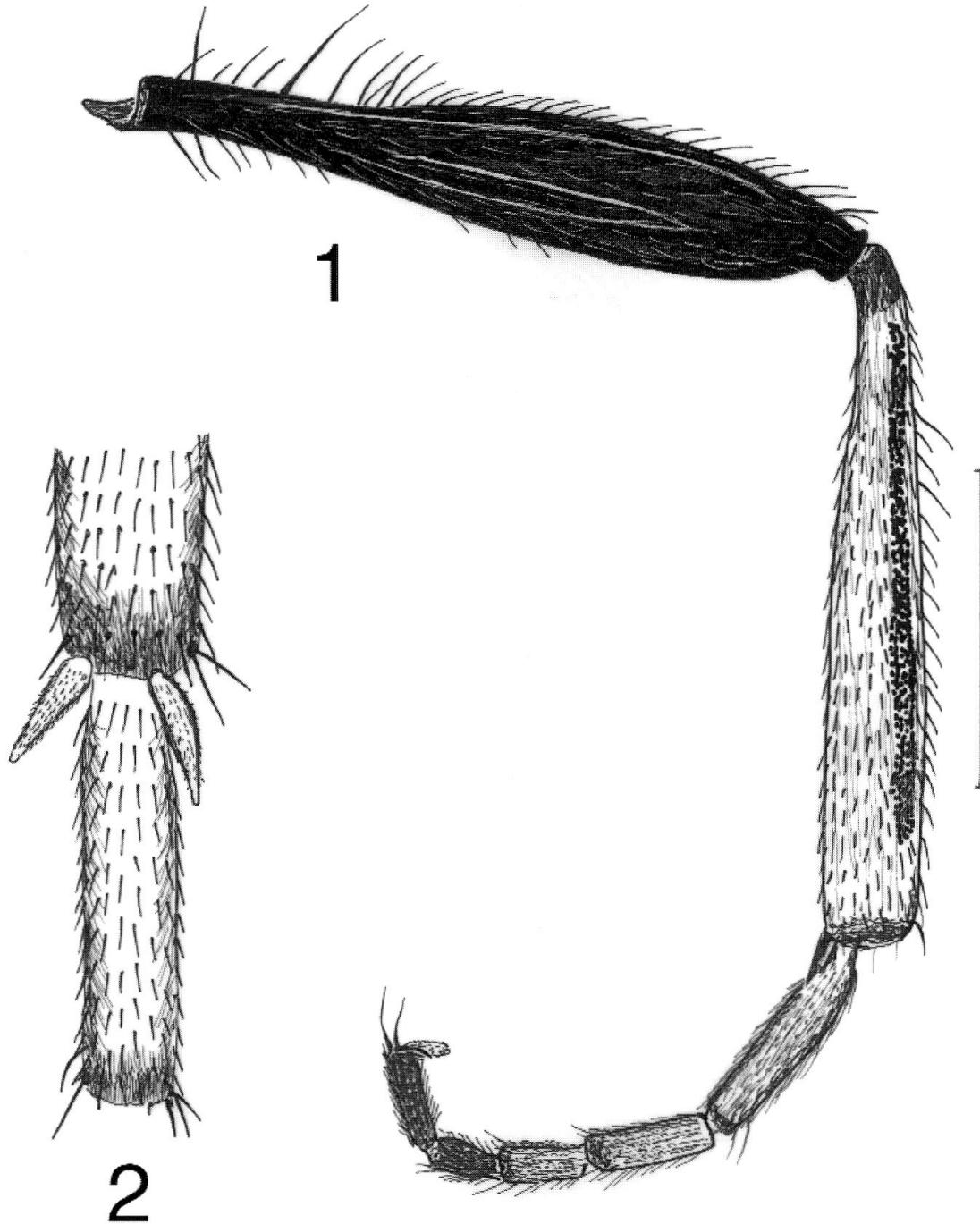
*Bibio handlirschi* Duda, 1930, Fliegen pal. Reg. 2(1): 56.

*Material studied.* Lectotype male (NHMW, in a good state of preservation, pinned directly on a #1 pin): 1) [7 x 5 mm, grey] «15.5.81» Handl.[irsch]; 2) [11 x 5.5 mm, grey] «Austria inf. Donauauen»; 3) [15 x 6.3 mm, white card] «albipennis» det. Ad. Handl.; 4) [9 x 7.5 mm, white] «Handlirschi n. sp. ♂ d. Duda»; 5) [14.5 x 6.5 mm, red] «Type»; 6) [26 x 14 mm, white card] «Lectotype ♂» [red ink?] «*Bibio handlirschi* Duda» [black ink, underlined] «selected by D.E. Hardy – 1960» [black ink].

Other material. Hungary: Budapest, Pestszentlőrinc, Péterhalmi-erdő, 29.IV.2006, 3 ♂♂, 1 ♀, L. Papp; *ibid.*, 1.V.2005, 2 ♂♂; *ibid.*, erdei tisztás [forest clearing], 29–30.IV.2001, 1 ♂, 1 ♀; *ibid.*, tölgyes, aljnövényzet [oak forest, on undergrowth], 1–4.V.2003, 1 ♂ (all L. Papp leg., HNHM).

Greece: Magnesia, Pilion SW slope, about 600m elevation, near Portaria, abandoned orchard, 18.IV.1979, 2 ♂♂, M. Dethier & N. Doneux-Stiernet leg. (MHNN).

*Diagnosis.* *B. handlirschi* belongs to the *Bibio* species with more or less equally long Rs and R-M veins and hind femora widening before middle. In the male, the cylindrical first hind tarsomere (Figs 1–2) will separate this species from most other medium sized European *Bibio*, except *B. ferruginatus* L., which has 8 flagellar segments on antennae (6–7 in *handlirschi*). *B. fulvicollis* (Gimm.) has a similar first hind tarsomere but hind femora clavate, widening only from middle. *B. hermoni* Skartveit & Kaplan from Israel seems very close to *handlirschi* after the original description and figures (Skartveit & Kaplan 1996): both species have a simi-



Figs 1–2. *Bibio handlirschi* Duda, male: 1, hind leg, inner (posterior) view (scale: 0.2 mm). – 2, apex of hind tibia and basitarsus, ventral view.

larly shaped cylindrical first hind tarsomere and antennae with 7 flagellar segments, but the epandrium is different, having a broadly U-shaped shallow posterior emargination in *B. hermoni* while it has a narrowly V-shaped deep posterior emargination (Fig. 3) in *B. handlirschi*. In the female, the 3 dark scutal bands on the rufous dorsum of the thorax are clearly (though thinly) separated and the halteres are yellowish white with grey dusted basis, which allows separation from similar species.

*Redescription* (male lectotype). Body length 5.27 mm (not precisely measurable owing to the downcurved abdomen), wing length 5.34 mm, wing width 1.93 mm.

Head, thorax and abdomen all black, lateral margins of abdominal tergites lighter, brown.

Eyes with long (0.23 mm) thin straight black hairs. Seven flagellomeres, apical one globular, narrower than penultimate. Ocellar triangle protruding, ca. 0.11 mm above eyes. Palpomeres as usual in *Bibio*, apical palpomere cylindrical, 0.21 mm long, 0.065 mm thick. Facets similar to other *Bibio* spp. males.

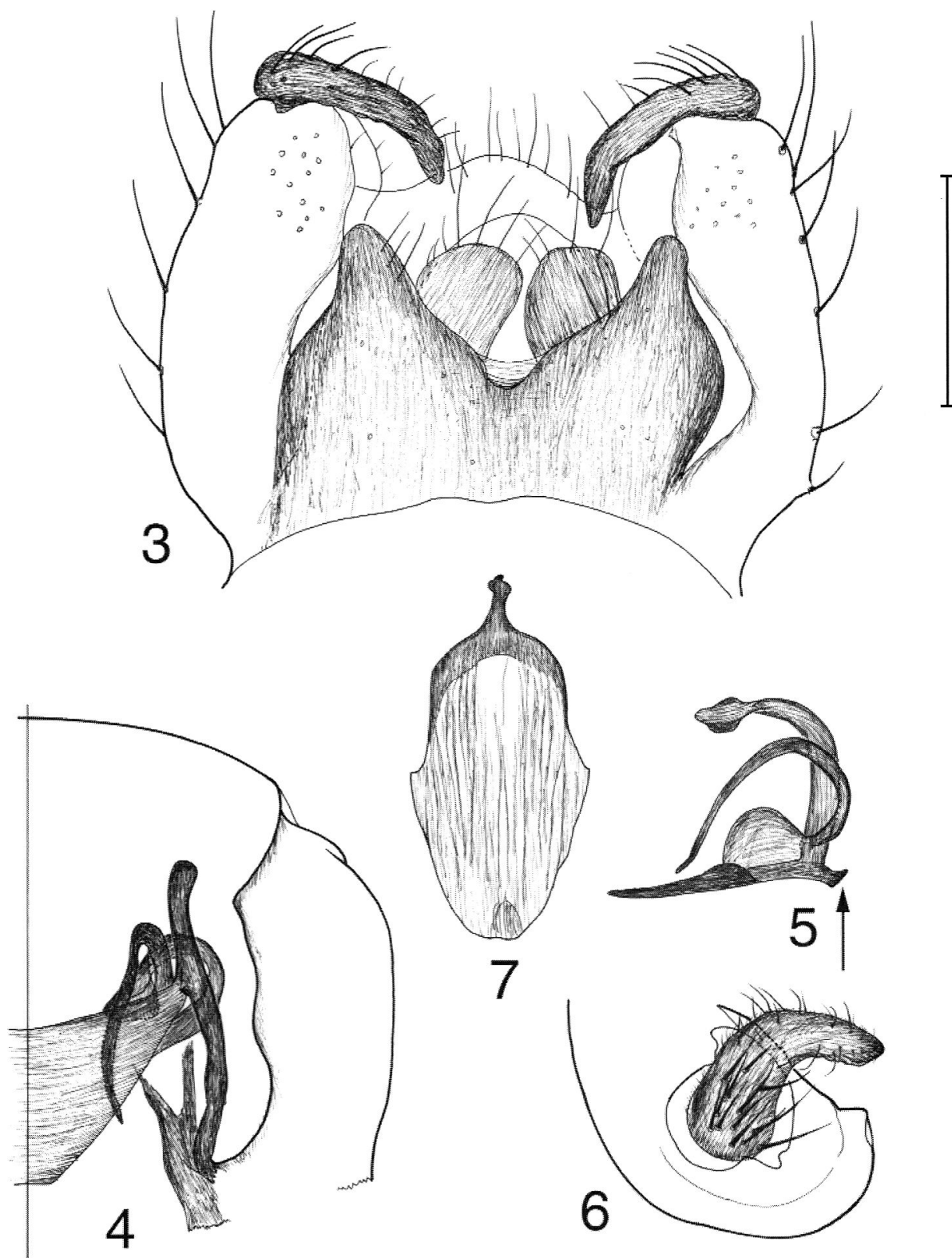
Setosity on dorsal part of thorax and on all abdomen black, but pleura with light greyish («white») long hairs. Similar light hairs present on fore coxa and on ventral surface of head. Almost all hairs ventrally on head are light, black hairs being present on the eye margins only. Dorsal parts of thorax and scutellum are moderately shiny. Pronotum and mesonotum finely granulose. A large lateral spot of fore coxa and another spot on katepisternum ventrally shiny, pleura otherwise grey microtomentose (with minute grey hairlets).

Wing membrane unicolorous light yellowish brown. Costal and radial veins of wing dark brown, costa exceeds  $R_5$  by 0.06–0.08 mm. M veins thick, light brown, Cu veins close to each other, rather discoloured.  $A_1$  similar to M veins in colour,  $A_2$  hardly discernible, distinct at base only. Pterostigma dark brown, 0.70 mm long, not paler basally than apically (in contrast with Duda's (1930) assertion in the original description). Veins R-R 0.32 mm, R-M 0.34 mm,  $M_{1+2}$  (stalk) 0.64 (left wing), 0.57 mm (right wing),  $M_1$ - $M_2$  0.09 mm (left), 0.165 mm (right). Halteres dull greyish brown.

Coxae, mid and hind femora black, fore femur black dorsally and ventrally, reddish yellow laterally on both sides (anterior and posterior surfaces). Mid and hind tibiae reddish yellow, fore tibia darker basally and ventrally. Hind femora widening from basal fourth, hind tibiae regularly widening from base (Fig. 1). Fore tarsomeres 4–5, mid and hind tarsomeres 3–5 black, other tarsomeres reddish yellow with dark apices. Length of fore tarsomeres 94 : 38 : 29 : 21 : 30 (multiply by 0.011 to have them in mm), hind tarsomeres 67 x 13 : 35 x 10 : 25 x 9 : 18 : 30. Hind tarsomere one (Figs 1–2) simple, cylindrical, not widening toward apex, about as long as the 2 following tarsomeres together. Claws arcuate, 0.175 mm from tip to base. Pulvilli and empodium are subequal in size. Apical thorn on fore tibia 0.13 mm and 0.22 mm long (measured on dorsal and ventral profile), tibial posterior appendage (from base of tarsus) 0.40 mm, fore tibia (from base to basitarsal base) 0.75 mm, hind tibia posterodorsally with several unarranged rows of sensillae in the whole length of tibia (except for its apical  $\frac{1}{7}$ ) (Fig. 1). Tip of posteroventral spur on both left and right hind tibiae broken on the lectotype, anteroventral spur 0.26 mm (on a male of similar size from Hungary anteroventral spur 0.24 mm and posteroventral one 0.21 mm long). Anteroventral spur seems blunt in ventral view (Fig. 2). Both spurs covered by small yellowish hairs.

*Male genitalia.* Most important features of male genitalia of the lectotype are fortunately well visible without preparation and they are the same as in males from Hungary (Figs 3–7, based on a male from Pestszentlőrinc).

Epandrium (Fig. 3) basally fused to hypandrium as in other *Bibio* spp., rather short caudally with deep V-shaped median incision; medially only 0.10 mm long,



Figs 3–7. *Bibio handlirschi* Duda, male genitalia: 3, outer terminalia, dorsal view (scale: 0.2 mm). – 4, gonocoxal apodeme and parameres, dorsal view (epandrium removed). – 5, parameres, full lateral view (insertion of gonocoxal apodeme marked with an arrow). – 6, gonostylus, broadest (subcaudal) view. – 7, ejaculatory apodeme and aedeagal complex, ventral view.



laterally (measured through apex of appendage) 2.5 times longer. Caudal appendages rather long narrowly rounded. Epandrium with medium-long setae only.

Gonostyli (Figs 3, 6) comparatively small, appearing rather narrow in dorsal view, but in their broadest view (Fig. 6) apically recurved, apical half narrowed, tip rounded; basal half with long setae.

Gonocoxal apodeme narrow, inserted less caudally (at apical  $\frac{1}{3}$  of the length of hypandrium), insertion of parameres at its  $\frac{11}{25}$  (Fig. 4).

Cerci and hypoproct rather membranous, latter broadly triangular, cerci appear as two almost wholly flat plates of 0.11 mm x 0.075 mm, with short (max. 0.07 mm) thin hairs.

Ejaculatory apodeme and aedeagus complex (Fig. 7) shovel-shaped as in other *Bibio* spp., but comparatively short and broad.

Fused parameres (Figs 4–5) structurally the same as in other *Bibio* spp., composed of two parts: a) a flat dorsal shield-shaped sclerite, which is inserted to gonocoxal apodeme. This is largely pentagonal in *B. handlirschi*, with cranial basis almost straight and with much narrowed caudal apex (Fig. 4); b) two pairs of basal lateral appendages («gonapophyses»): medial pair curved ventrally, then caudally, with much broadened apex; lateral appendage broad basally, inserted slightly caudally to the medial one, continued in a thin, apically sharp sclerite, which is down-and-up-curving and reaching dorsal plate of the parameres apically. Basal, ventrally directed, lateral continuation of the dorsal plate short and not strongly sclerotised (long and strong e.g. in *B. marci*).

*Female.* The original description in Duda (1930) is adequate. Additional description below is based on the females from Pestszentlőrinc. Head black, including antennae and palpi.

Thorax, abdomen and legs mostly yellowish red. Pronotum dark medially. Mesonotum with 3 broad, thinly separated dark brown stripes: medial one from pronotum to the level of wing base, lateral pair from the level of anterior spiracle to the level of calyptal base. Basalare, ventral  $\frac{2}{3}$  of katapisternum continuing to prosternum, as well as meron dark, shiny. Scutellum yellow, metanotum black.

Setosity on dorsal parts of thorax yellowish, rather short and adpressed but comparatively thick. Pleural as well as abdominal hairs whitish, longer but thinner than on dorsal parts.

Trochanters, knees, apices of tibiae and of tarsi dark. Almost all the apical tarsomeres, or at least their apical half, dark. Pterostigma of wing shorter and lighter than in males, much fainter in cell c than in cell  $r_1$ . Female halteres waxy yellowish, only basal part of stalk darker, grey dusted.

Medial part of abdominal tergites darker greyish yellow, sternites clear yellow. Cerci short, ca. 0.20 mm only, yellow, with fine yellowish hairs (max. 0.11 mm long).

*Remarks.* The original description is accurate, and the new material from Hungary and Greece will key out correctly at *B. handlirschi* using the key in Duda (1930). Some minor differences may be noticed: male pleural hairs are not yellow but light greyish. However the colour of the thoracic pilosity is highly variable in several species of *Bibio* and of no taxonomic value as recently pointed out again by Skartveit (2006). Both Duda (1930) and Hardy (1967) pointed out the finely shagreened mesonotum, especially on sides, a character also conspicuous on the new material from Hungary and Greece. The diagnostic characters (see above) make *B.*

*handlirschi* an easily recognizable species, at least in the male sex. Male specimens from Hungary are very similar to the lectotype (some of them are smaller), with wing membrane somewhat lighter, light yellowish; some specimens with fore femur almost wholly black, fore tibia more extensively dark. As usual in many *Bibio* species, there is a marked individual variability in wing venation (with some specimens having M-M, M<sub>1</sub> and M<sub>2</sub> originating from the same point) and in segmentation of the antennal flagellum (flagellomeres 5–6 partly fused in some specimens). In the female, the 3 dark brown scutal bands are clearly, though very narrowly separated (contrarily to the related species) and the halteres are yellowish white with basis only grey dusted.

#### NOTES ON BIOLOGY AND DISTRIBUTION

The biotope of capture in Hungary is a small (ca. 200 ha) mixed forest of planted Scots pine (*Pinus sylvestris*), planted black locust (*Robinia pseudacacia*) and oak (*Quercus* spp.) (with black cherry *Prunus serotina* and some other alien plant species). Poplars (*Populus* spp.) are maintaining their populations, although fully grown trees will die and fall down from time to time, as a consequence of inadequate humidity. In all probability, originally there was an open woodland on sandy soil there, with oak groves and small grassy meadows. In Central Europe, a poplar litter on sandy soil may be the common character of the biotopes of the known localities. This feature is shared by «Donauauen bei Wien», the Péterhalmi-erdő, (i.e. a forest on sandy soil of mostly artificial, human made composition) and the supposed *Junipereto-Populetum* at Kiskunhalas. However, the Greek known locality, an abandoned orchard, looks quite different. It is too early to discuss the distribution of the species, but we think that it may be wider than presently known.

The collecting date of the type specimens and of the recent specimens is the same, between end of April and middle of May. The flight period of *B. handlirschi* must be short: the specimens captured recently in Hungary were all collected within a week-long period only. However, a second generation might be on flight in August since Duda (1930) writes for the collecting date of the Kiskunhalas females «24.VIII.02» (we consider Zilahy-Sebess' (1960) «V., VII.» indication for these specimens as an error).

It may look strange that specimens of a rather well-sized dipterous species have not been collected for 100 years in Central Europe. For instance, in Hungary several millions of dipterous specimens have been collected since 1956. In the future, attention should be given to small and medium *Bibio* species in South-Eastern Europe.

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