

Redescriptions of thirteen species of chewing lice in the *Brueelia*-complex (Phthiraptera, Ischnocera, Philopteridae), with one new synonymy and a neotype designation for *Nirmus lais* Giebel, 1874

Daniel R. Gustafsson¹, Lucie Oslejskova², Tomas Najer³, Oldrich Sychra², Fasheng Zou¹

¹ Guangdong Key Laboratory of Animal Conservation and Resource Utilization, Guangdong Public Laboratory of Wild Animal Conservation and Utilization, Guangdong Institute of Applied Biological Resources, 105 Xingang West Road, Haizhu District, Guangzhou, 510260, China

² Department of Biology and Wildlife Diseases, Faculty of Veterinary Hygiene and Ecology, University of Veterinary and Pharmaceutical Sciences, Palackeho tr. 1946/1, 612 42, Brno, Czech Republic

³ Department of Veterinary Sciences, Faculty of Agriculture, Food and Natural Resources, Czech University of Life Sciences, Kamýcka 129, 165 00 Prague 6, Czech Republic

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Corresponding author: Daniel R. Gustafsson (kotatsu@fripost.org)

Abstract

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redescription

Thirteen species of chewing lice in the *Brueelia*-complex are redescribed and illustrated. They are: *Brueelia blagovescenskyi* Balát, 1955, ex *Emberiza schoeniclus* (Linnaeus, 1758); *B. breueri* Balát, 1955, ex *Chloris chloris* (Linnaeus, 1758); *B. conocephala* (Blagoveshchensky, 1940) ex *Sitta europaea* (Linnaeus, 1758); *B. ferianci* Balát, 1955, ex *Anthus trivialis* (Linnaeus, 1758); *B. glizi* Balát, 1955, ex *Fringilla montifringilla* Linnaeus, 1758; *B. kluzi* Balát, 1955, ex *Fringilla coelebs* Linnaeus, 1758; *B. kratochvili* Balát, 1958, ex *Motacilla flava* Linnaeus, 1758; *B. matvejevi* Balát, 1981, ex *Turdus viscivorus* Linnaeus, 1758; *B. pelikani* Balát, 1958, ex *Emberiza melanocephala* Scopoli, 1769; *B. rosickyi* Balát, 1955, ex *Sylvia nisoria* (Bechstein, 1792); *B. vaneki* Balát, 1981, ex *Acrocephalus schoenobaenus* (Linnaeus, 1758); *Guimaraesiella haftorni* (Balát, 1958) ex *Turdus iliacus* Linnaeus, 1758; *G. lais* (Giebel, 1874) ex *Luscinia megarhynchos* (Brehm, 1831). Redescriptions are made from type material where available. Holotypes are identified in Balát's material when possible, and lectotypes are designated for *B. blagovescenskyi*, *B. breueri*, *B. glizi*, *B. ferianci*, *B. kluzi*, *B. kratochvili*, *B. pelikani*, and *B. rosickyi*; a neotype of *Nirmus lais* Giebel, 1874 is designated. *Brueelia weberi* Balát, 1982, is placed as a synonym of *Brueelia conocephala* (Blagoveshchensky, 1940).

Introduction

Correct identification of chewing lice (Phthiraptera) to species level is often hampered by inadequate species descriptions. During work on a recent revision of the species-rich *Brueelia*-complex (Gustafsson and Bush 2017), it became apparent that the majority of the described species in this group are impossible to identify without comparison with type material. Several recent publications have provided redescriptions of some key taxa (e.g., Mey and Barker 2014, Valim and Cicchino 2015, Gustafsson and Bush 2017, Mey 2017, Gustafsson

et al. 2018a); however, the majority of the proposed species in this complex are still poorly described and only partially illustrated.

To partially address the difficulties in identifying lice in this complex, we here redescribe 13 species of chewing lice in the *Brueelia*-complex: 10 species in the genus *Brueelia* Kéler, 1936 and two species in the genus *Guimaraesiella* Eichler, 1949. Redescriptions of 10 of these species are based on type material, complemented in some cases by non-type material. In most species, the present status of Balát's specimens is addressed, including notes on specimens that must be regarded as lost. To

stabilize the nomenclature and anchor the descriptions and illustrations here to specific specimens, we also designate a number of lectotypes and paralectotypes from Balát's syntype series.

In addition, we redescribe *Nirmus lais* Giebel, 1874, based on specimens in Balát's collection, and designate one of these as the neotype of this species. Moreover, we here consider one proposed species name, *Brueelia weberi* Balát, 1982, as a synonym of an older species name, *Degeeriella conocephala* Blagoveshtchensky, 1940. We take the opportunity to redescribe *D. conocephala* as well, based on non-type specimens in Balát's collection.

With these redescriptions, only one species of *Brueelia* and *Guimaraesiella* described by Balát remain without modern redescriptions: *Guimaraesiella tovornikae* (Balát, 1981). We were unable to find any specimens of *G. tovornikae* at the Moravian Museum, and the types must therefore be assumed to be lost. Gustafsson and Bush (2017) saw specimens identified as this species in the Brelih Collection at the Slovenian Museum of Natural History (Ljubljana, Slovenia) but did not redescribe this species.

Material and methods

We examined slide-mounted specimens in František Balát's collection deposited at the Moravian Museum, Brno (MMBC). In addition, we examined some specimens from the Natural History Museum, London, United Kingdom (NHML), the Slovenian Museum of Natural History, Ljubljana, Slovenia (PMSL), and the Museum of Natural History, University of Wrocław, Poland (MNHW). We typically only illustrated and measured specimens at the MMBC; other specimens were only examined visually. In some cases, we were unable to illustrate, for example, male genitalia accurately, even if specimens in other collections were better preserved than the ones at the MMBC. Specimens were examined in an Olympus CX31 microscope. Illustrations were drawn by hand, using a drawing tube fitted to the microscope. Line drawings were scanned, collated, and edited in GIMP (<http://www.gimp.org>). Grey lines in all illustrations denote the approximate extent of dark pigmentation on heads, tergopleurites, and female subgenital plates; these patterns typically differ slightly between specimens of the same species and sometimes between sides of the same specimen.

Measurements were made in Quick PHOTO MIKRO 3.1 (Promicra, Prague, Czechia). Measurements are given in millimetres for the following dimensions: AW = abdominal width (at segment V); HL = head length (at midline); HW = head width (at temples); PRW = prothoracic width (at posterior end); PTW = pterothoracic width (at posterior end); TL = total length (at midline). Terminology of chaetotaxy and morphological structures follows Gustafsson and Bush (2017), and include: *aps* = *accessory post-spiracular seta*; *mms* = *marginal mesometanotal setae*; *pst1–2* = *parameral setae 1–2*; *pts* = *post-temporal*

seta; *ss* = *sutural setae*; *vms* = *vulval marginal setae*; *vos* = *vulval oblique setae*; *vss* = *vulval submarginal setae*. Counts of *vos* include the distal *vos* typically situated median to the *vss*. Setal characters are given in *italics*.

Host taxonomy follows Clements et al. (2018). The species treated here are ordered according to host family.

Note on Balát's type series

In the original descriptions of most of the species redescribed here, Balát explicitly mentioned a single male and a single female as type specimens but listed all other specimens examined as "other material". Article 72.4.6 of the International Code of Zoological Nomenclature (1999) states that if an author establishing a new species-group taxon uses the term "type" or its equivalents for some specimens, but also lists other specimens, these additional specimens are excluded from the type series. Balát appears to have been unaware of this, and labeled several non-type slides as "paratypes", including some slides deposited in other collections. These specimens have no special status, and are not either paratypes or paralectotypes.

Systematics

PHTHIRAPTERA Haeckel, 1896

Ischnocera Kellogg, 1896

Phloptera Burmeister, 1838

Brueelia-complex

Brueelia Kéler, 1936

Phlopterus Nitzsch, 1818: 288 (*in partim*).

Nirmus Nitzsch, 1818: 291 (*in partim*).

Degeeriella Neumann, 1906: 60 (*in partim*).

Painjunirmus Ansari, 1947: 285.

Allobrueelia Eichler, 1951: 36 (*in partim*).

Nigronirmus Złotorzycka, 1964: 248.

Spironirmus Złotorzycka, 1964: 261.

Serinirmus Soler Cruz, Rodríguez, Florido-Navío and Muñoz Parra, 1987: 244.

Type species. *Brueelia rossittensis* Kéler, 1936: 257 [= *Nirmus brachythorax* Giebel, 1874: 134] (by original designation).

Brueelia blagovescenskyi Balát, 1955

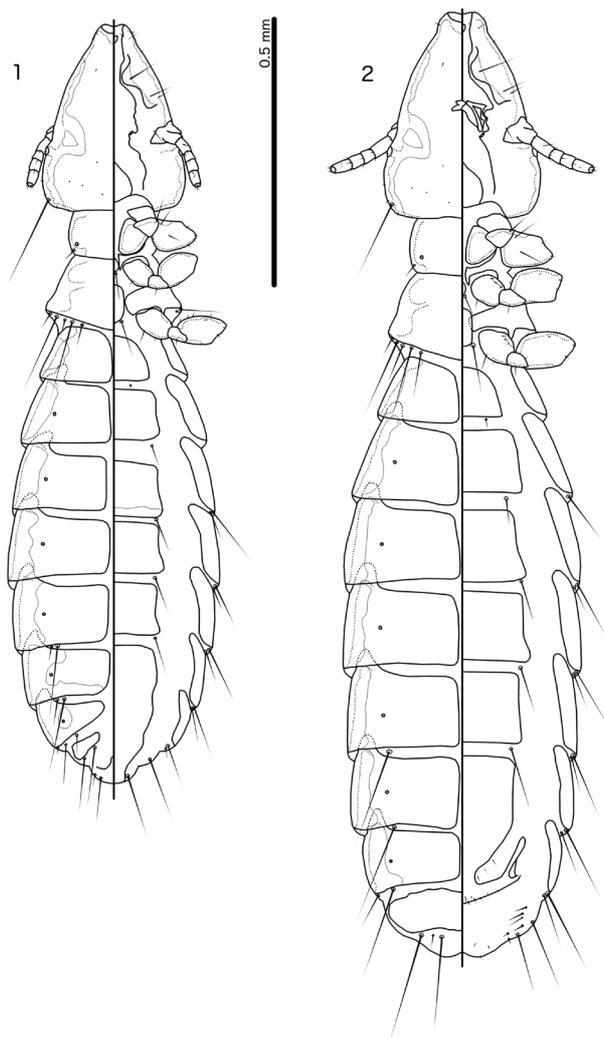
Figs 1–5

Brueelia blagovescenskyi Balát, 1955: 504.

Type host. *Emberiza schoeniclus* (Linnaeus, 1758), reed bunting (Emberizidae).

Type locality. Hodonín, "Kapříška", Czechia.

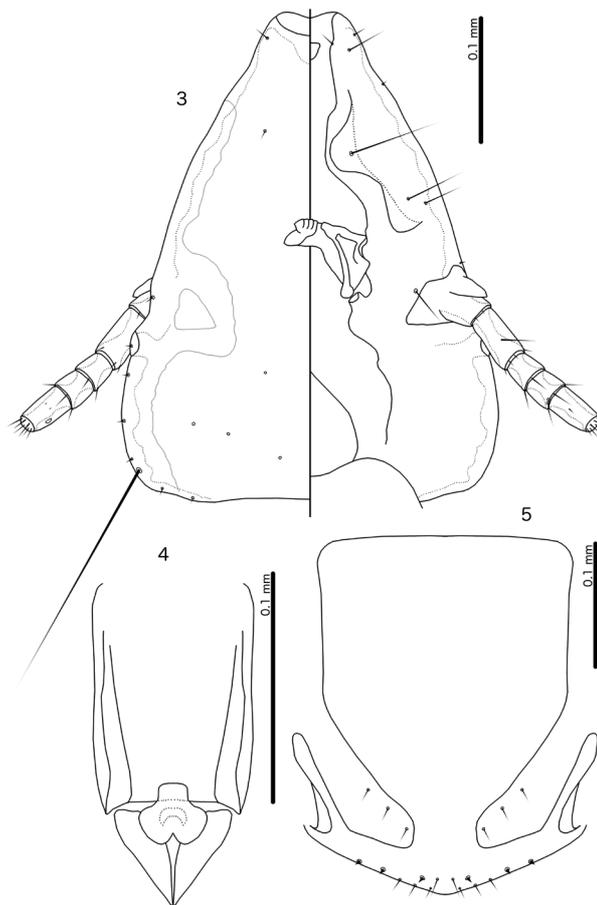
Description. *Both sexes.* Head trapezoidal (Fig. 3), lateral margins of preantennal area concave distally and convex proximally, frons widely concave. Marginal cari-



Figures 1, 2. *Brueelia blagovescenskyi* Balát, 1955, ex *Emberiza schoeniclus* (Linnaeus, 1758) **1** Male habitus, dorsal and ventral views **2** Female habitus, dorsal and ventral views.

na slender, much displaced at osculum. Ventral anterior plate small, shield-shaped. Head chaetotaxy and pigmentation pattern as in Figure 3. Preantennal nodi not bulging. Preocular nodi slightly larger than post-ocular nodi. Marginal temporal carina slender, with undulating median margins. Gular plate slender, lanceolate. Thoracic and abdominal segments and pigmentation patterns as in Figures 1, 2; sternites V–VI and subgenital plates medium brown in both sexes.

Male. Thoracic and abdominal chaetotaxy as in Figure 1; due to thickness of cover glass on single examined male, smaller setae (e.g., *ss*) not visible, and may be overlooked. Mandibles distorted in single examined male, and not illustrated. Male genitalia of single examined male partially obscured by gut content, and shape of basal apodeme unknown. Proximal mesosome near quadratic (Fig. 4), mesosomal lobes relatively small, gonopore wider than long. Parameres broadly elongated distally (Fig. 4). Measurements ($n = 1$): TL = 1.43; HL = 0.35; HW = 0.27; PRW = 0.17; PTW = 0.25; AW = 0.37.



Figures 3–5. *Brueelia blagovescenskyi* Balát, 1955, ex *Emberiza schoeniclus* (Linnaeus, 1758) **3** Female head, dorsal and ventral views **4** Male genitalia, dorsal view **5** Female subgenital plate and vulval margin, ventral view.

Female. Thoracic and abdominal chaetotaxy as in Figure 2. Subgenital plate pentagonal (Fig. 5), with broad connection to cross-piece. Vulval margin convergent to median point, with 3 short, slender *vms* and 3–5 short, thorn-like *vss* on each side; 4 short, slender *vos* on each side of subgenital plate; distal 1 *vos* median to *vss*. Measurements ($n = 2$): TL = 1.79–1.80; HL = 0.39–0.40; HW = 0.30–0.31; PRW = 0.20; PTW = 0.29–0.30; AW = 0.45–0.48.

Type material. **Lectotype** ♂, Hodonín, “Kapříška”, Czechia, 2 Apr. 1949, F. Balát, 404a (MMBC). **Paralectotypes.** 1♀, same data as lectotype, 404b (MMBC).

Non-types. 1♀, same data as lectotype, 404c (MMBC).

Remarks. Balát (1955) mentioned a type male and female on slide no. 404. The same handwritten notes are on slides 404a and 404b. As Balát (1955) did not explicitly designate a holotype, both examined type specimens mentioned in original description represent syntypes. We hereby designate the male on slide 404a as the lectotype of *B. blagovescenskyi*. The other syntype becomes a paralectotype. In addition, Balát (1955) mentioned two females and 15 nymphs from the same host species as other (non-type) material. Except one female on slide

404c, these have not been found in the MMBC collection, and must be assumed to be lost. Our redescription of this species is therefore based only on the lectotype and paralectotype, and the single non-type female.

The lectotype male and paralectotype female (404a–b) are mounted on slides using a second slide used as a cover slide, which blurs the outline of the thoracic and abdominal plates and prevents using higher magnifications. Accurate illustration of the male genitalia is impossible without remounting the specimen, which was not attempted; the genitalia are therefore illustrated approximately. Moreover, smaller setae are very hard to see, and especially smaller abdominal setae of the male may have been overlooked. The female 404b lacks a subgenital plate. For the head and female illustrations, the non-type female specimen (slide 404c) was used. Fresh collections are needed to establish the correct abdominal and leg chaetotaxy of males of this species, as well as the shape of the male genitalic elements.

Brueelia pelikani Balát, 1958

Figs 6–12

Brueelia pelikani Balát, 1958: 414.

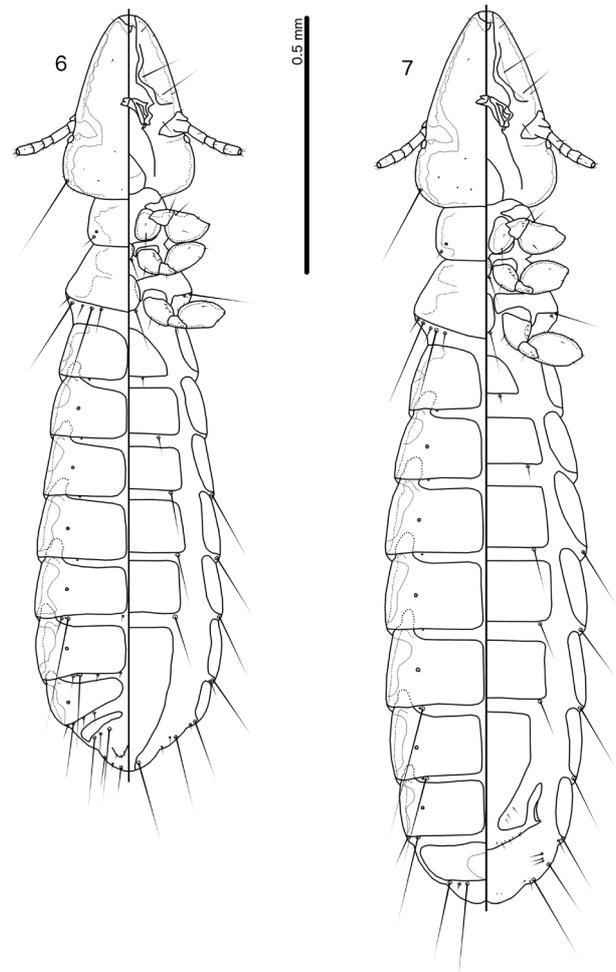
Type host. *Emberiza melanocephala* Scopoli, 1769, black-headed bunting (Emberizidae).

Type locality. Sliven, Bulgaria.

Description. *Both sexes.* Head slender, rounded dome-shaped (Fig. 8). Marginal carina slender much displaced at osculum. Ventral anterior plate small, shield-shaped. Head chaetotaxy and pigmentation pattern as in Fig. 8. Preantennal nodi not bulging. Preocular nodi slightly larger than postocular nodi. Marginal temporal carina slender, with undulating median margin. Gular plate broadly triangular, with rounded anterior margins. Thoracic and abdominal segments and pigmentation patterns as in Figures 6, 7; sternal plates get progressively browner in more posterior segments, and subgenital plate of both sexes medium brown.

Male. Thoracic and abdominal chaetotaxy as in Figure 6; *ss* visible only on tergopleurites VI–VII in one male, but distal tergopleurites distorted in both examined males and *ss* on other segments may be overlooked. Basal apodeme slender, with concave lateral margins (Fig. 9). Proximal mesosome gently rounded (Fig. 10). Mesosomal lobes wide, high convergent distally; rugose area limited to distal margin. Gonopore longer than wide. Penile arms not extending distal to mesosome. Parameres moderate in width, much elongated distally (Fig. 11); *pst1–2* not visible in examined specimens. Measurements ($n = 3$): TL = 1.46–1.52; HL = 0.35; HW = 0.25; PRW = 0.17–0.18; PTW = 0.25–0.26; AW = 0.32–0.36.

Female. Thoracic and abdominal chaetotaxy as in Figure 7. Subgenital plate pentagonal (Fig. 12), with broad connection to cross-piece. Vulval margin convergent to rounded median point, with 2 or 3 short, slender *vms* and

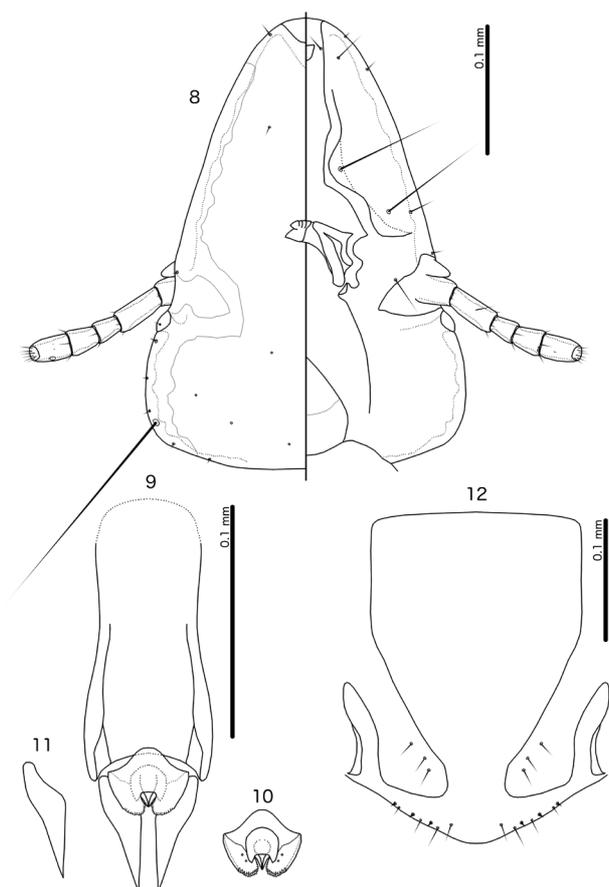


Figures 6, 7. *Brueelia pelikani* Balát, 1958, ex *Emberiza melanocephala* Scopoli, 1769 **6** Male habitus, dorsal and ventral views **7** Female habitus, dorsal and ventral views.

3 short, thorn-like *vss* on each side; 2–4 short, slender *vos* on each side of subgenital plate; distal 1 *vos* median to *vss*. Measurements ($n = 7$, except PTW where $n = 6$, and AW where $n = 5$): TL = 1.62–1.84; HL = 0.36–0.38; HW = 0.26–0.28; PRW = 0.18–0.19; PTW = 0.27–0.28; AW = 0.37–0.41.

Type material. **Lectotype** ♂, Sliven, Bulgaria, 24 May 1957, F. Balát, 969a (MMBC), **Paralectotypes.** 5♀, same data as lectotype, 969a–c (MMBC). 1♂, Sliven, Bulgaria, 26 May 1957, F. Balát, 934 (MMBC). 1♀, Kap Maslennos, Bulgaria, 5 June 1957, F. Balát, 980 (MMBC). 1♂, 1♀, same data as lectotype, 969d, Brit. Mus. 1958–452 (NHML).

Remarks. Balát (1958) did not designate a holotype for *B. pelikani*, but he mentioned that he had examined 3 males, 8 females, and 12 nymphs from 3 hosts; collectively these form the syntype series. The text “Type male and female” is written by hand on the label of slide 969a, and “paratypes” on slides 969b–c. Another slide (969d) with 1♂, 1♀ deposited at the NHML (Brit. Mus. 1958–452) is marked “paratypes”. Presently, five slides with a total of two males, six females, and one nymph are de-



Figures 8–12. *Brueelia pelikani* Balát, 1958, ex *Emberiza melanocephala* Scopoli, 1769 **8** Male head, dorsal and ventral views **9** Male genitalia, dorsal view **10** Male mesosome, ventral view **11** Male paramere, dorsal view **12** Female subgenital plate and vulval margin, ventral view.

posited at the MMBC. All specimens other than these and the two specimens at the NHML have been lost. To settle the identity of this species, we hereby designate the male on slide 969a as the lectotype of *B. pelikani*. The other syntypes become paralectotypes.

The abdomen of this lectotype male is unfortunately disrupted distally, which has affected the genitalia. In the paralectotype male 934, the mesosome is partially obscured by gut content, and the shape of the proximal mesosome cannot be seen clearly. We have illustrated the mesosome as seen in the lectotype, but the other genital elements as seen in the paralectotype male (934).

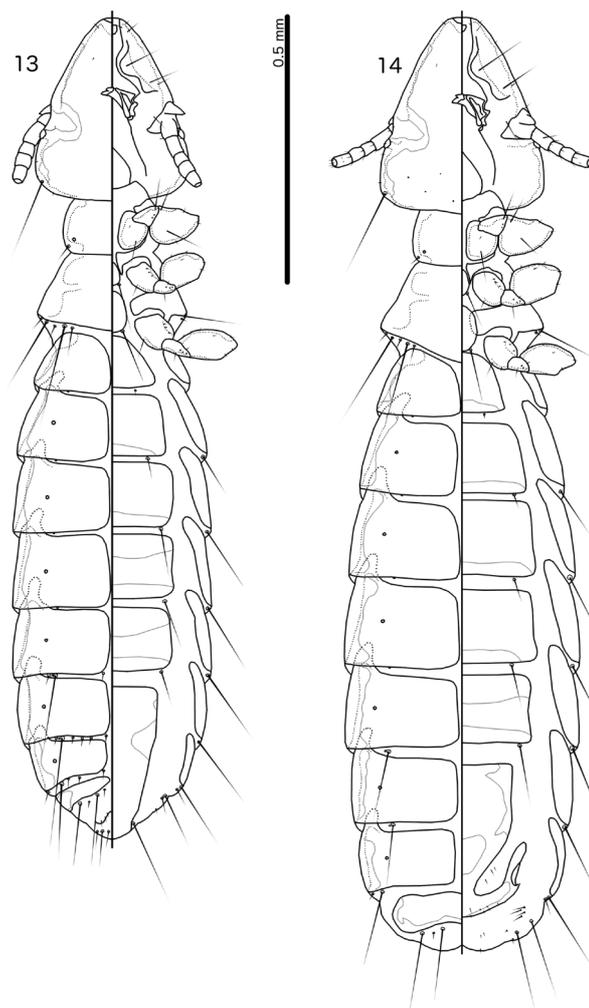
Brueelia breueri Balát, 1955

Figs 13–19

Brueelia breueri Balát, 1955: 505.

Type host. *Chloris chloris* (Linnaeus, 1758), European greenfinch (Fringillidae).

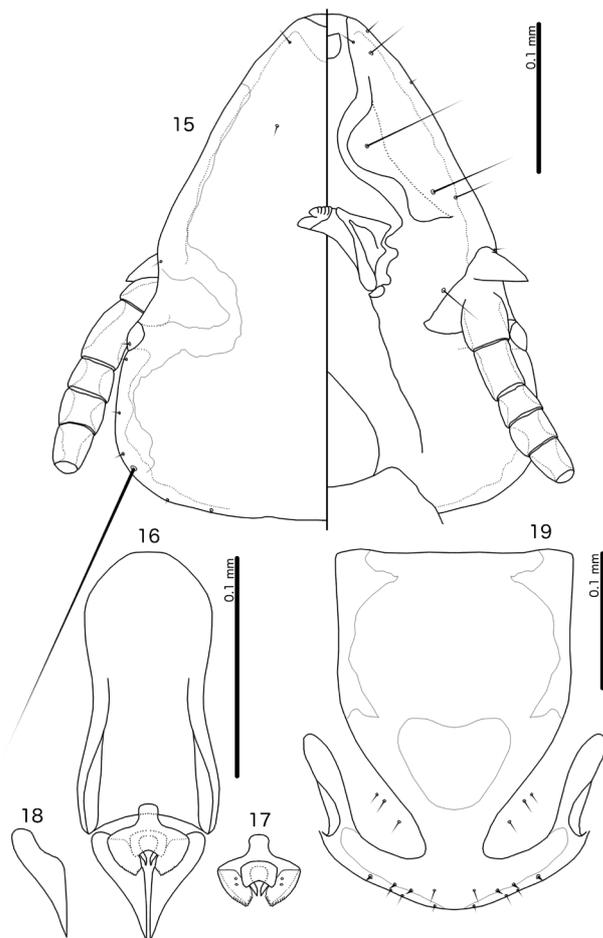
Type locality. Gabčíkovo, Slovakia.



Figures 13–14. *Brueelia breueri* Balát, 1955, ex *Chloris chloris* (Linnaeus, 1758). **13** Male habitus, dorsal and ventral views; **14** Female habitus, dorsal and ventral views.

Description. Both sexes. Head flat dome-shaped (Fig. 15), lateral margins of preantennal area slightly convex, frons broadly concave. Marginal carina narrow, deeply displaced and widened at osculum, median margin undulating. Ventral anterior plate small, shield-shaped. Head chaetotaxy and pigmentation patterns as in Figure 15; head sensilla and *pts* not visible in examined specimens. Preantennal nodi not bulging. Preocular nodi much larger than postocular nodi. Marginal temporal carina moderate in width, with undulating median margin. Gular plate lanceolate, slender. Thoracic and abdominal segments and pigmentation patterns as in Figures 13, 14.

Male. Thoracic and abdominal chaetotaxy as in Figure 13. Basal apodeme with deeply concave lateral margins (Fig. 16). Proximal mesosome roughly quadratic, with rounded corners, small (Fig. 17). Mesosomal lobes wide, highly convergent distally; rugose area limited to distal margin. Gonopore wider than long. Penile arms not reaching distal margin of mesosome. Parameres slender (Fig. 18), distal part elongated; *pst1–2* not visi-



Figures 15–19. *Brueelia breueri* Balát, 1955, ex *Chloris chloris* (Linnaeus, 1758) **15** Male head, dorsal and ventral views **16** Male genitalia, dorsal view **17** Male mesosome, ventral view **18** Male paramere, dorsal view **19** Female subgenital plate and vulval margin, ventral view.

ble in examined specimen. Measurements ($n = 3$, except HW where $n = 2$): TL = 1.29–1.55; HL = 0.31–0.34; HW = 0.28; PRW = 0.15–0.18; PTW = 0.24–0.30; AW = 0.32–0.37.

Female. Thoracic and abdominal chaetotaxy as in Figure 14. Subgenital plate rounded pentagonal (Fig. 19), with broad connection to cross-piece; pigmentation patterns as in Figure 19. Vulval margin gently rounded, with 3 short, slender *vms* and 3 or 4 short, thorn-like *vss* on each side; 3 or 4 short, slender *vos* on each side of subgenital plate; distal 1 *vos* median to *vss*. Measurements ($n = 6$): TL = 1.59–1.95; HL = 0.35–0.38; HW = 0.28–0.32; PRW = 0.18–0.20; PTW = 0.27–0.32; AW = 0.38–0.47.

Type material. **Lectotype** ♂ Gabčíkovo, Slovakia, 25 Mar. 1954, F. Balát, 676 (MMBC). **Paralectotype.** 1♀, Podunajské Biskupice, Slovakia, 20 July 1953, F. Balát, 1118a (MMBC).

Non-types. 1♀, same data as lectotype, 676 (MMBC). 1♂, same data as lectotype, Brit. Mus. 1955-662

(NHML). 1♂, 2♀, same data as paralectotypes, 1118b, c (MMBC). 5♀, Neslovice, Czechia, 6 Aug. 1958, F. Balát 1179 (MMBC). 1♂, 1♀, Brno, Czechia, 9. Jan. 1960, F. Balát, 1327 (MMBC). 1♀, same data as paralectotypes, Brit. Mus. 1955-662 (NHML).

Remarks. Balát (1955) designated a male from Gabčíkovo and a female from Podunajské Biskupice as types; these are therefore syntypes. The word “type” is written in pencil on the slides 676 and 1118a in the MMBC collection. In addition, Balát mentioned seven females and one male from the same two hosts, and one female from Tormafölek (Zala m., Hungary, 4 Apr. 1952, leg. Georg Breuer; not at MMBC) as “other material”, which do not comprise type material. Presently, there are 4 slides of *B. breueri* with a total of two males and four females deposited at MMBC. The other four females, including that from Hungary, are lost. Therefore, to settle the identity of this species, we hereby designate the male on slide 676 as the lectotype of *B. breueri*. The other syntypes become paralectotypes. Some specimens deposited in the NHML are called “paratypes”, are not type specimens, as they are not referred to as such in the original publication.

Both antennae of the lectotype male are folded underneath the head and seemingly squashed. We have here reversed the dorsal view of the antenna and illustrated it in a more natural position; the antenna in the ventral view is illustrated as in the specimen. However, in both cases the antennae are likely narrower than illustrated here. As both antennae are displaced, the precise location of antennal setae cannot be established, and these have therefore not been illustrated here. Additional material is needed to fully redescribe *B. breueri*.

Brueelia glizi Balát, 1955

Figs 20–26

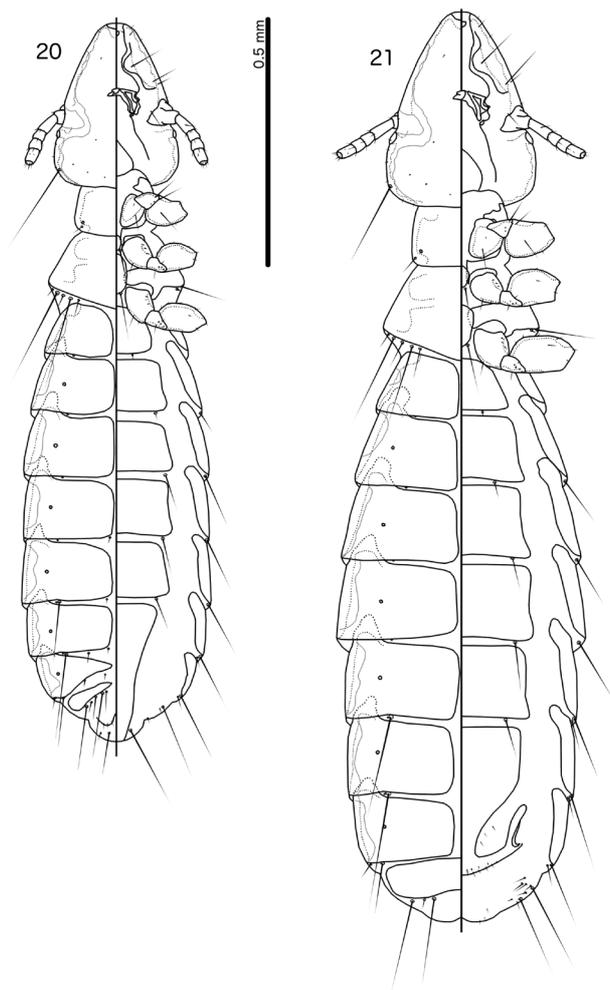
Brueelia glizi Balát, 1955: 509.

Type host. *Fringilla montifringilla* Linnaeus, 1758, brambling (Fringillidae).

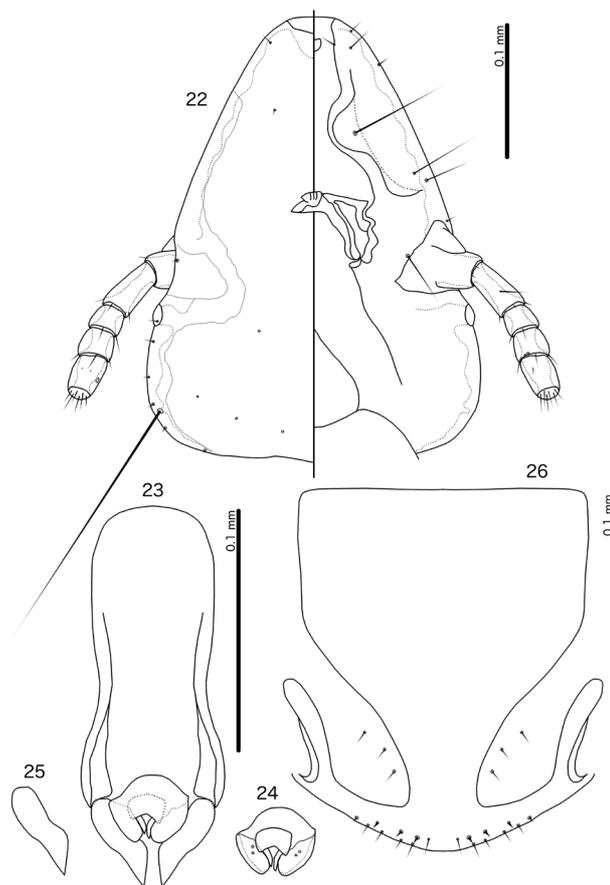
Type locality. Hodonín, Czechia.

Description. **Both sexes.** Head flat dome-shaped (Fig. 22), lateral margins of preantennal area slightly convex, frons broadly flattened to slightly concave. Marginal carina narrow, deeply displaced at osculum, median margin undulating. Ventral anterior plate small, shield-shaped. Head chaetotaxy and pigmentation patterns as in Figure 22. Preantennal nodi not bulging. Preocular nodi larger than postocular nodi. Marginal temporal carina moderate in width, median margin undulating. Gular plate slender, lanceolate. Thoracic and abdominal segments and pigmentation patterns as in Figures 20, 21.

Male. Thoracic and abdominal chaetotaxy as in Figure 20. Male genitalia asymmetrical in single examined male, and here illustrated as seen in lectotype, in dorso-lateral view. Basal apodeme slender, with concave



Figures 20, 21. *Brueelia glizi* Balát, 1955, ex *Fringilla montifringilla* Linnaeus, 1758 **20** Male habitus, dorsal and ventral views **21** Female habitus, dorsal and ventral views.



Figures 22–26. *Brueelia glizi* Balát, 1955, ex *Fringilla montifringilla* Linnaeus, 1758 **22** Male head, dorsal and ventral views **23** Male genitalia, dorsal view, except mesosome which is distorted in specimen and here illustrated in dorso-lateral view **24** Male mesosome, ventro-lateral view **25** Male paramere, dorsal view **26** Female subgenital plate and vulval margin, ventral view.

lateral margins (Fig. 23). Proximal mesosome distorted in syntype, but seemingly gently rounded (Fig. 24). Mesosomal lobes broad, convergent distally; rugose area not visible, likely limited. Gonopore wider than long. Parameres partially everted in single syntype male, and true shape may be slightly different than what is illustrated (Fig. 25); *pst1–2* not visible. Measurements ($n = 1$): TL = 1.46; HL = 0.33; HW = 0.25; PRW = 0.17; PTW = 0.26; AW = 0.36.

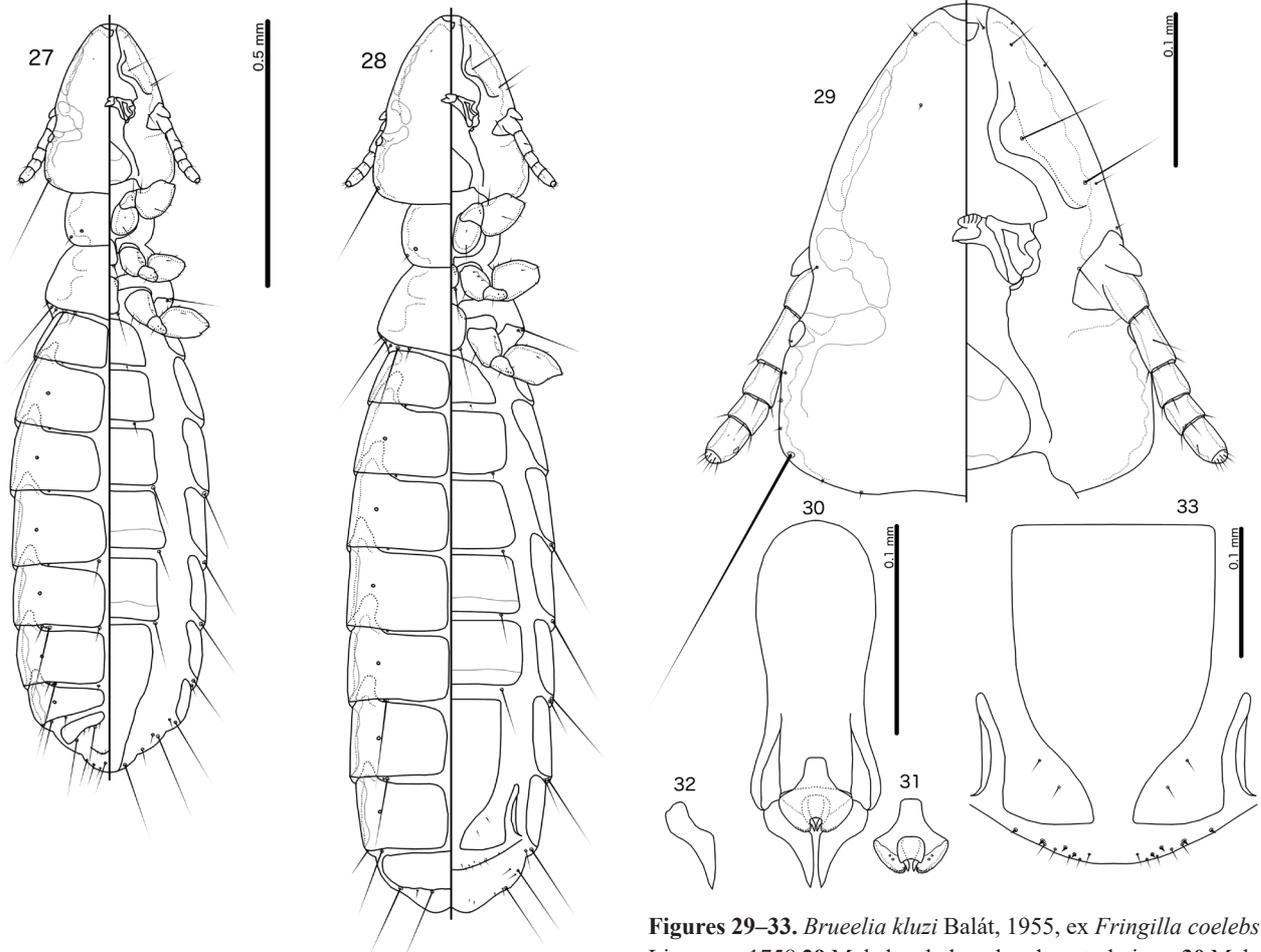
Female. Thoracic and abdominal chaetotaxy as in Figure 21. Subgenital plate funnel-shaped, with broad connection to cross-piece (Fig. 26). Vulval margin gently rounded, with 4 or 5 short, slender *vms* and 3 or 4 short, thorn-like *vss* on each side; 4 short, slender *vos* on each side of subgenital plate; distal 1 *vos* median to *vss*. Measurements ($n = 7$): TL = 1.70–1.90; HL = 0.38–0.39; HW = 0.29–0.31; PRW = 0.20–0.22; PTW = 0.30–0.31; AW = 0.43–0.48.

Type material. **Lectotype** 1♂, Hodonín, Czechia, 10 Feb. 1952, F. Balát, 672a (MMBC). **Paralectotype.** 1♀, same data as lectotype, 672a (MMBC).

Non-type material. 6♀, same data as lectotype, F. Balát, 647, 672b–c (MMBC). 1♀, same data as lectotype, Brit. Mus. 1955–662 (NHML). 1♂, 1♀, same data as lectotype, no. 734 (MNHW).

Remarks. Balát (1955) designated one male and one female on slide 672 as types, but did not explicitly designate either of these as holotype; these therefore constitute the syntype series. The specimens are designated as “types” on the handwritten label. Another nine females and two nymphs were mentioned from the same host specimen, and one female from a different host specimen. Presently, four slides with one male, seven females and one nymph are present at the MMBC; the remaining specimens must be regarded as lost. To settle the identity of *B. glizi*, we hereby designate the male on slide 672a as the lectotype, and the female on the same slide as paralectotype. Specimens deposited at the NHML and MNHW are labeled “paratypes”, but these are not mentioned as paratypes in the original description, and thus do not have type status.

Additional material is necessary to describe the male genitalia accurately.



Figures 27, 28. *Brueelia kluzi* Balát, 1955, ex *Fringilla coelebs* Linnaeus, 1758 **27** Male habitus, dorsal and ventral views **28** Female habitus, dorsal and ventral views.

Figures 29–33. *Brueelia kluzi* Balát, 1955, ex *Fringilla coelebs* Linnaeus, 1758 **29** Male head, dorsal and ventral views **30** Male genitalia, dorsal view **31** Male mesosome, ventral view **32** Male paramere, dorsal view **33** Female subgenital plate and vulval margin, ventral view.

Brueelia kluzi Balát, 1955

Figs 27–33

Brueelia kluzi Balát, 1955: 512.

Type host. *Fringilla coelebs* Linnaeus, 1758, chaffinch (Fringillidae).

Type locality. Lednice, Czechia.

Description. *Both sexes.* Head flat-dome shaped (Fig. 29), lateral margins of preantennal area convex, frons rounded to slightly flattened. Marginal carina moderate in width, shallowly displaced and widened at osculum, median margin undulating. Ventral anterior plate small, shield-shaped. Head chaetotaxy and pigmentation patterns as in Figure 29; head sensilla and *pts* not visible in examined specimens. Preantennal nodi with slight median bulge. Preocular nodi larger than post-ocular nodi. Marginal temporal carina moderate in width, undulating. Gular plate not entirely clear in examined specimens, but roughly lanceolate. Thoracic and abdominal segments and pigmentation patterns as in Figures 27, 28.

Male. Thoracic and abdominal chaetotaxy as in Figure 27; *ss* not visible on tergopleurite VIII in any examined male, but likely present if more specimens are examined. Basal apodeme not clearly visible in any examined males, and here illustrated approximately (Fig. 30); seemingly slender, with lateral margins concave. Proximal mesosome elongated, trapezoidal with concave lateral margins (Fig. 31). Mesosomal lobes broad, highly convergent distally; rugose area limited to distal margin. Gonopore longer than wide. Parameres slender, elongated distally (Fig. 32); *pst1–2* not visible in examined males. Measurements ($n = 4$): TL = 1.32–1.41; HL = 0.31–0.32; HW = 0.24–0.25; PRW = 0.15–0.17; PTW = 0.23–0.25; AW = 0.30–0.36.

Female. Thoracic and abdominal chaetotaxy as in Figure 28. Subgenital plate roughly rectangular, with narrow connection to cross-piece (Fig. 33). Vulval margin rounded laterally, but roughly flat or slightly rounded medianly, with 4 short, slender *vms* and 4 or 5 short, thorn-like *vss* on each side; 3 short, slender *vos* on each side of subgenital plate; distal 1 *vos* median to *vss*. Measurements

($n = 11$): TL = 1.59–1.76 (1.68); HL = 0.35–0.37 (0.36); HW = 0.27–0.29 (0.28); PRW = 0.18–0.20 (0.19); PTW = 0.27–0.29 (0.28); AW = 0.35–0.41 (0.39).

Type material. Lectotype 1♂, Lednice, Czechia, 26 Mar. 1953, F. Balát, 1138 (MMBC). Paralectotype. 1♀, same data as lectotype (MMBC).

Non-type material. 3♂, 8♀, same data as lectotype (MMBC). 1♀, Točná, Czechia, 23 May 1938, leg. K. Pflieger, Pfl13 (MMBC). 1♀, Skanör, Sweden, 12 Nov. 1963, F. Balát, 1315 (MMBC). 1♀, Břeclav - Kančí obo-ra, Czechia, 22 May 1953, F. Balát, 1477 (MMBC).

Remarks. Balát (1955) did not explicitly designate a holotype, but mentioned one male and one female on slide 15/53 (= number on host's ring, current slide number 1138) as types; these comprise the syntype series. This is confirmed by Balát's handwritten notes on the slide label. In addition, he mentioned three males and eight females from the same host specimen, and one female from a different host as additional material. These are all present in the Balát collection at the MMBC. We hereby select the male on slide 1138 as the lectotype, and one of the females on the same slide as a paralectotype. These have been marked on the slide with dark spots.

All examined specimens in Brno are poorly cleared, and many are still attached to feather fragments that further obscure the morphology. As a result, thoracic and abdominal chaetotaxy and plates are not always clearly visible, and are here illustrated as accurately as possible. Vulval setae only clearly visible in one female, and range of variation may be greater than given above if more specimens are examined.

Brueelia conocephala (Blagoveshtchensky, 1940)

Figs 34–40

Degeeriella conocephala Blagoveshtchensky, 1940: 64.

Brueelia conocephalus (Blagoveshtchensky, 1940); Hopkins and Clay 1952: 54.

Brueelia conocephala (Blagoveshtchensky, 1940); Gustafsson and Bush 2017: 39.

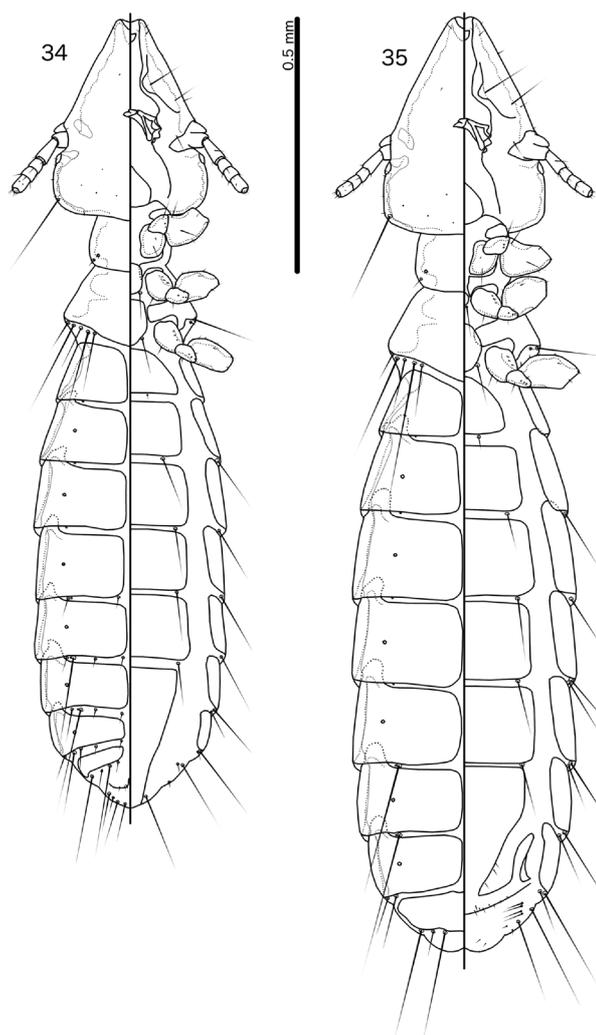
Brueelia weberi Balát, 1982: 44, **new synonymy**.

Type host. *Sitta europaea caucasica* Reichenow, 1901, Eurasian nuthatch (Sittidae).

Type locality. Alexeyevka, Talysh Lowlands, Lenkoran province [= Lankaran], Azerbaijan.

Other hosts. *Sitta europaea caesia* Wolf, 1810. *Sitta europaea rubiginosa* Tschusi & Zarodny, 1905. *Parus major* Linnaeus, 1758. See Gustafsson et al. (2018b) for a discussion on the type host of this species.

Description. **Both sexes.** Head rounded triangular (Fig. 36), lateral margins of preantennal area more or less straight, in some specimens slightly concave or convex, frons narrowly concave. Marginal carina broad, widening slightly in anterior third, with undulating median margins. Ventral anterior plate shield-shaped, with anterior margin slightly concave. Head chaetotaxy and



Figures 34, 35. *Brueelia conocephala* (Blagoveshtchensky, 1940) ex *Sitta europaea* (Linnaeus, 1758) **34** Male habitus, dorsal and ventral views **35** Female habitus, dorsal and ventral views.

pigmentation patterns as in Figure 36. Preantennal nodi not bulging. Pre-ocular nodi much larger than postocular nodi. Marginal temporal carina moderate in width, with undulating median margin. Gular plate diffuse in most examined specimens, but seemingly rounded lanceolate. Thoracic and abdominal segments and pigmentation patterns as in Figures 34, 35.

Male. Thoracic and abdominal chaetotaxy as in Figure 34. Basal apodeme of more or less even width, lateral margins only slightly concave (Fig. 37). Proximal mesosome rounded trapezoidal, with concave lateral margins (Fig. 38). Mesosomal lobes broad, with almost parallel lateral margins; rugose area extensive along distal margin. Gonopore semi-oval, about as wide as long. Penile arms almost reach distal margin of mesosome. Parameres slender proximally, broad at mid-point, and tapering distally, elongated (Fig. 39); *pst1–2* as in Figure 39. Measurements ex *Sitta europaea caesia* ($n = 13$): TL = 1.39–1.53 (1.49); HL = 0.38–0.40 (0.39); HW = 0.27–

0.30 (0.29); PRW = 0.16–0.18 (0.17); PTW = 0.25–0.29 (0.27); AW = 0.31–0.39 (0.36). Measurements ex *Parus major major* ($n = 1$): TL = 1.47; HL = 0.37; HW = 0.29; PRW = 0.18; PTW = 0.26; AW = 0.36.

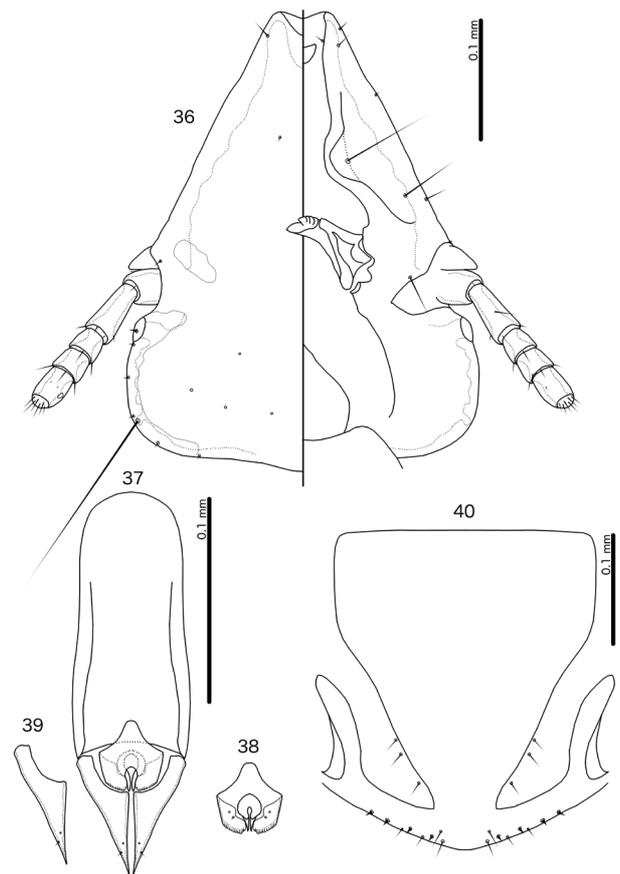
Female. Thoracic and abdominal chaetotaxy as in Figure 35. Subgenital plate shaped as in Figure 40, with broad connection to cross-piece. Vulval margin convergent to median point or slightly rounded medianly. Vulval chaetotaxy different but overlapping between material from the two host species: 3–5 short, slender *vms* and 2–4 short, thorn-like *vss* on each side in specimens from *Sitta europaea caesia*, but 3 or 4 short, slender *vms* and 3 or 4 short, thorn-like *vss* on each side in specimens from *Parus major major*. Material from both host species has 3 or 4 short, slender *vos* on each side of subgenital plate, with distal 1 *vos* median to or only slightly anterior to *vss*. Measurements ex *Sitta europaea caesia* ($n = 24$, except PRW where $n = 23$): TL = 1.68–1.92 (1.79); HL = 0.42–0.44 (0.43); HW = 0.31–0.34 (0.33); PRW = 0.18–0.21 (0.20); PTW = 0.28–0.33 (0.31); AW = 0.35–0.47 (0.43). Measurements ex *Parus major major* ($n = 5$): TL = 1.81–1.95; HL = 0.41–0.44; HW = 0.33–0.35; PRW = 0.20–0.22; PTW = 0.30–0.33; AW = 0.43–0.49.

Type material. **Holotype** ♀ of *Brueelia weberi*, Serahn, [Kreis Neustrelitz, Germany], 7 Oct. 1977, F. Balát, 1448 (MMBC). **Paratypes** of *Brueelia weberi*: 1♀, same data as holotype, F. Balát, 1449 (MMBC). 1♂, 3♀, Chropyně, Czechia, 3 Nov. 1977, F. Balát, 1381a–d (MMBC).

Non-type material. Ex *Sitta europaea caesia*: 10♂, 19♀, Košice, Slovakia, 5 Nov. 1953, F. Balát, 1080 (MMBC). 1♂, Lednice – Kančí obora, Czechia, 10 Jun. 1953, F. Balát, 1079 (MMBC). 1♀, Hodonín, Czechia, 12. Feb. 1954, F. Balát, 1078 (MMBC). 2♂, 4♀, Hodonín, Czechia, 24 Nov. 1952, F. Balát, 651 (MMBC).

Remarks. Balát (1982) explicitly designated the female on slide 1448 as the holotype *Brueelia weberi*, and several other specimens as paratypes. This is confirmed in his handwritten notes on the slides. All specimens are present in the MMBC collection, with the exception that there is only one slide marked “Př90”. However, this female and one of the paratype males (slide 1411) represent a separate species (see below) and have, therefore, been excluded from the paratypes.

We have examined Balát’s type and non-type material identified as *B. weberi*, and compared these with his extensive collection of *B. conocephala* from *Sitta europaea caesia*. No diagnostic characters that could separate these two species have been found, and most measurements for specimens from *P. major* fall within the range of the measurements for specimens from *S. europaea*. We therefore consider *B. weberi* to be a synonym of *B. conocephala*. There is enough variation in the head shape and measurements of Balát’s specimens of *B. conocephala* to accommodate the perceived differences in dimensions reported by Balát (1982), and the reported differences in the shape of the parameres can be ascribed to individual variation or artificial differences due to mounting.



Figures 36–40. *Brueelia conocephala* (Blagoveshchensky, 1940) ex *Sitta europaea* (Linnaeus, 1758) **36** Male head, dorsal and ventral views **37** Male genitalia, dorsal view **38** Male mesosome, ventral view **39** Male paramere, dorsal view **40** Female subgenital plate and vulval margin, ventral view.

Balát collected *B. weberi* from several localities, and it would appear that this species is well established on the host, *Parus major*. This is in contrast to the only other material known from birds in the *P. major*-complex reported by Gustafsson et al. (2018b). They described two species of *Brueelia* (*B. picea* Gustafsson et al. 2018b and *B. nazae* Gustafsson et al. 2018b) which they did not consider to be closely related to *B. conocephala*. However, all material Gustafsson et al. (2018b) examined was from non-European members of the *P. major*-complex.

Interestingly, the “paratype” male on slide 1411 (Břeclav – Kančí obora, Czechia, 5 Mar. 1954, F. Balát, 1411, MMBC) and “paratype” female on slide Př90 (Chuchle, Czechia, 28 Jan. 1938, K. Pflieger, Př90, MMBC) represent a different, undescribed, species of *Brueelia*. The male specimen is similar to *B. nazae* in head shape, but more similar to *B. picea* in the shape of the genitalia; the abdominal chaetotaxy is different from both species, with *aps* on abdominal segment IV (absent in both *B. picea* and *B. nazae*). The female specimen is slightly different in head shape from the male specimen, and may represent a different species. We do not describe this species here, as more material is needed to sort out whether both spe-

cies of *Brueelia* actually occur on *P. major* in Europe, or whether Pflieger's and Balát's material originated in contaminations or stragglers.

Brueelia ferianci Balát, 1955

Figs 41–47

Brueelia ferianci Balát, 1955: 508.

Nigrionirmus ferianci (Balát, 1955); Złotorzycka 1964: 250.

Type host. *Anthus trivialis trivialis* (Linnaeus, 1758), tree pipit (Motacillidae).

Type locality. Nesyt, Czechia.

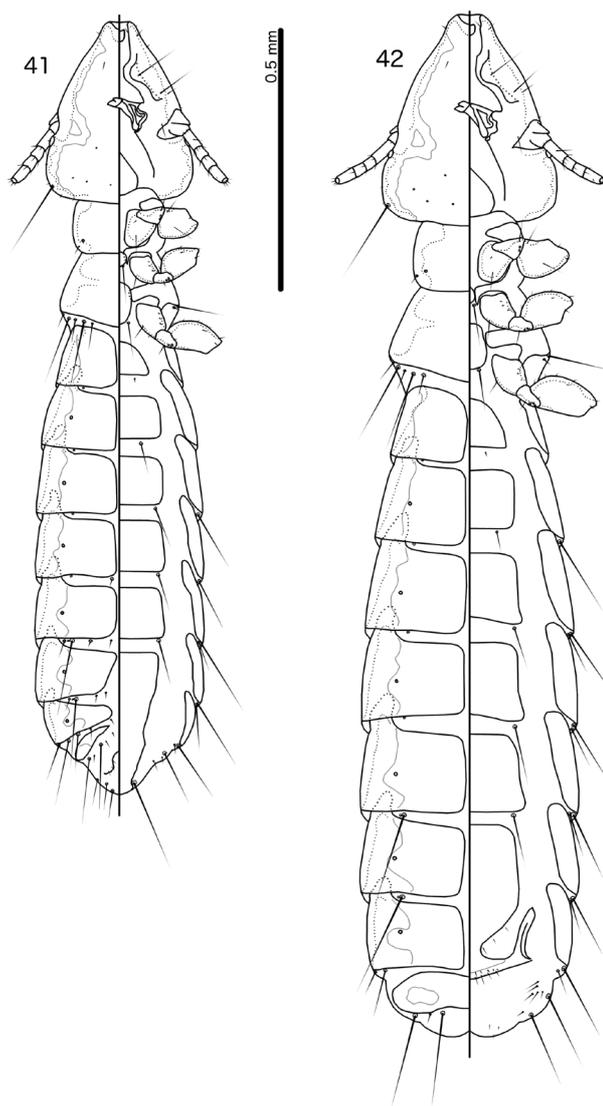
Description. Both sexes. Head trapezoidal (Fig. 43), lateral margins of preantennal area convex proximally and concave distally, frons broadly flattened to slightly concave. Marginal carina broad, irregular, narrowing conspicuously near *dsms*, deeply displaced and much widened at osculum. Ventral anterior plate elongated. Head chaetotaxy and pigmentation patterns as in Figure 43. Preantennal nodi wide, slightly bulging. Pre- and postocular nodi large. Marginal temporal carina wide, with undulating median margin. Gular plate rounded triangular. Thoracic and abdominal segments and pigmentation patterns as in Figures 41, 42.

Male. Thoracic and abdominal chaetotaxy as in Figure 41. Basal apodeme with concave lateral margins (Fig. 44). Proximal mesosome short but broad (Fig. 45), roughly trapezoidal with concave lateral margins. Mesosomal lobes wide, medianly bent and convergent distally; rugose area extensive over ventral surface of distal mesosome. Gonopore semi-oval, longer than wide. Parameres broad, elongated distally (Fig. 46); *pst1–2* as in Figure 46. Measurements ($n = 11$, except TL where $n = 10$): TL = 1.36–1.52 (1.41); HL = 0.32–0.36 (0.34); HW = 0.26–0.29 (0.27); PRW = 0.17–0.19 (0.18); PTW = 0.24–0.26 (0.25); AW = 0.29–0.35 (0.32).

Female. Thoracic and abdominal chaetotaxy as in Figure 42. Subgenital plate quadratic or widening slightly distally, connection to cross-piece moderate in width; pigmentation pattern as in Figure 47. Vulval margin gently rounded, in some specimens bulging slightly in median section, with 2–6 short, slender *vms* and 3 or 4 short, thorn-like *vss* on each side; 3–5 short, slender *vos* on each side of subgenital plate; distal 1 *vos* median to *vss*. Measurements ($n = 98$, except TL and AW where $n = 96$, and PTW where $n = 97$): TL = 1.68–2.05 (1.83); HL = 0.36–0.41 (0.38); HW = 0.29–0.39 (0.31); PRW = 0.19–0.23 (0.20); PTW = 0.26–0.34 (0.30); AW = 0.35–0.51 (0.41).

Type material. Lectotype ♂, Nesyt, Czechia, 8 Apr. 1953, F. Balát, 1062 (MMBC). **Paralectotype.** 1♀, same data as holotype (MMBC).

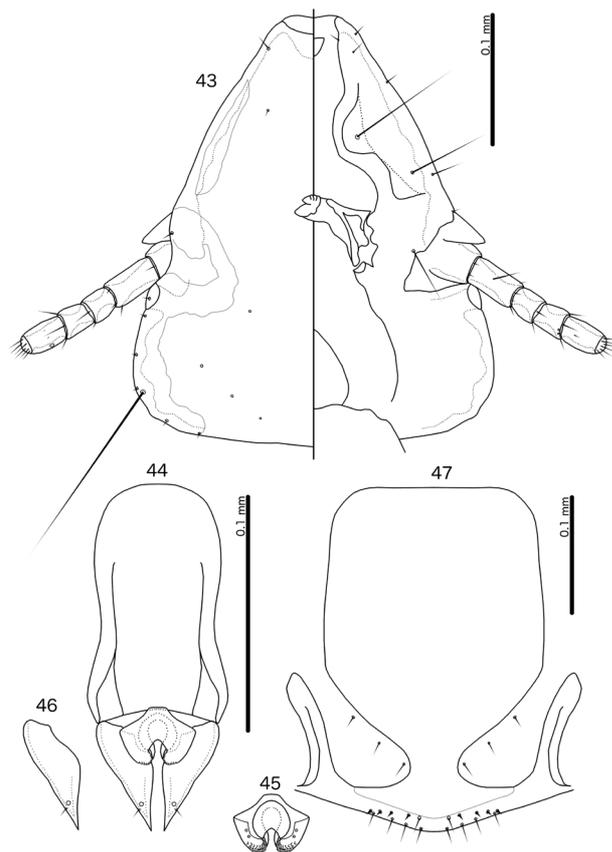
Non-type material. 1♂, 6♀, same data as holotype, F. Balát, 1062, 1127, 1177 (MMBC). 1♀, same data as holotype, Brit. Mus. 1955-662 (NHML). 2♀, Hodonín, Czechia, 16 Aug. 1949, F. Balát, 553 (MMBC). 1♀, Liteň, Czechia, 20 May 1938, K. Pflieger, Pfl14 (MMBC). 2♀,



Figures 41, 42. *Brueelia ferianci* Balát, 1955, ex *Anthus trivialis* (Linnaeus, 1758) 41 Male habitus, dorsal and ventral views 42 Female habitus, dorsal and ventral views.

Kuřim, Czechia, 12 May 1955, F. Balát, 714 (MMBC). 1♀, Falsterbo, Sweden, 17 Sep. 1963, F. Balát, 1272 (MMBC). 2♀, Hodonín, Czechia, 16 Aug. 1949, F. Balát, 553 (MMBC). 4♂, 6♀, Goljaki, Trnovski Gozd, Slovenia, 18 June 1965, S. Brelih, 11521–11530 (PMSL); 1♂, 2♀, “S. Spain”, Spain, 27 Apr. 1961, Varma Coll. No. A310, Brit. Mus. 1962-325 (NHML); 6♂, 79♀, Morocco, Oct. 1938, R. Meinertzhagen, 11773, 11976 (NHML).

Remarks. Balát (1955) did not explicitly designate a holotype for *B. ferianci*, but mentioned a male and a female as types. On slide no. 1062, which contains three specimens, the male is circled; on the label, the ♂ is circled within a box that reads “Typ ♂ a ♀”. We therefore consider this to be an indication that Balát considered this to be the holotype. However, as he did not explicitly name it as such in the original publication, it is a syntype, not a holotype. We hereby designate this male the lectotype, and



Figures 43–47. *Brueelia ferianci* Balát, 1955, ex *Anthus trivialis* (Linnaeus, 1758) **43** Male head, dorsal and ventral views **44** Male genitalia, dorsal view **45** Male mesosome, ventral view **46** Male paramere, dorsal view **47** Female subgenital plate and vulval margin, ventral view.

the female syntype thus becomes a paralectotype. Presently, all material listed by Balát (1955) is at the MMBC, except one female at the NHML and one female we have not been able to locate; this specimen must be regarded as lost. Another three females (slide no. 1177) were collected from the same host species at the same day on the same location as holotype, but according to ring number (42/53) these lice are from another host specimen that is not mentioned in original paper. The specimen deposited at NHML is labeled “paratype”, but has no type status.

The width of the frons differs somewhat between different specimens. The head is here illustrated from the holotype, whereas the full-body illustration is from a more narrow-headed specimen, to illustrate the variation in this species. Most specimens examined are more similar to the narrow-headed illustration. We do not presently consider these differences to be of any taxonomic importance, as the specimens we have examined are otherwise similar. However, fresh material from a number of host subspecies and populations may reveal that the material we have examined represents multiple species. Antennae in holotype and paratype males folded under the head, and here illustrated based on non-type material.

Brueelia kratochvili Balát, 1958

Figs 48–54

Brueelia kratochvili Balát, 1958: 413.

Nigrionirmus kratochvili (Balát, 1958); Złotorzycka 1964: 250.

Type host. *Motacilla flava feldegg* Michahelles, 1830, yellow wagtail (Motacillidae).

Type locality. Burgas, Bulgaria.

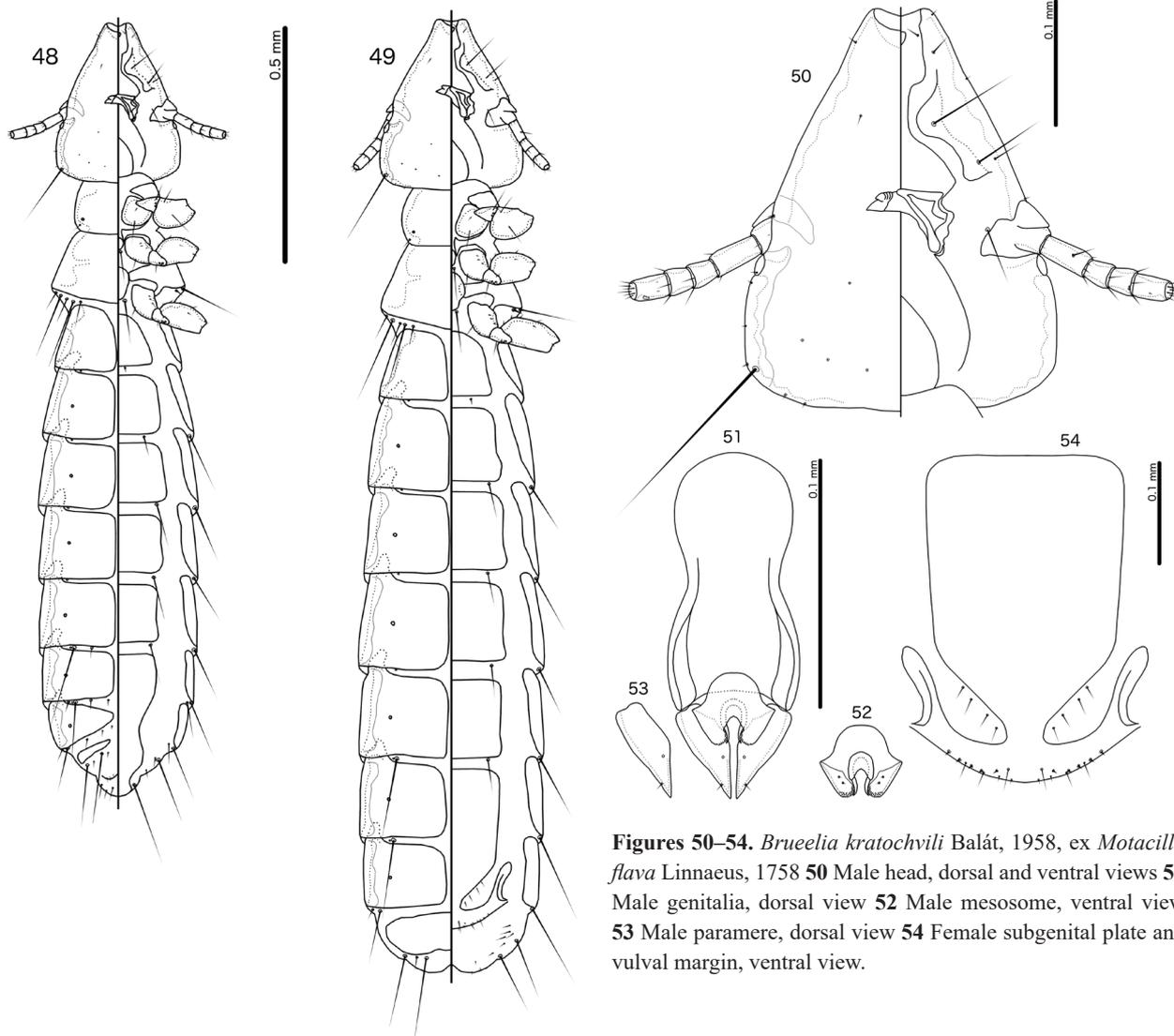
Other hosts. *Motacilla flava* Linnaeus, 1758, yellow wagtail. *Motacilla tschutschensis macronyx* (Stresemann, 1920), Eastern yellow wagtail. *Motacilla alba* Linnaeus, 1758, white wagtail, **new host record**.

Description. Both sexes. Head slender, trapezoidal (Fig. 50), lateral margins of preantennal area convex proximally and slightly concave distally, frons concave. Marginal carina of moderate width, narrowing conspicuously at *dsms*, much displaced and widened at osculum. Ventral anterior plate small, rounded rectangular, hard to see in many specimens. Head chaetotaxy and pigmentation patterns as in Figure 50. Preantennal nodi moderate, not bulging. Pre- and postocular nodi moderate. Marginal temporal carina of moderate width, with median margin undulating. Gular plate lanceolate. Thoracic and abdominal segments and pigmentation patterns as in Figures 48, 49.

Male. Thoracic and abdominal chaetotaxy as in Figure 48. Basal apodeme constricted at about midpoint (Fig. 51). Proximal mesosome large (Fig. 52), gently rounded. Mesosomal lobes broad, highly convergent distally; rugose area extensive in distal end. Gonopore semi-oval, longer than wide. Parameres broad, extended distally (Fig. 53); *pst1–2* as in Figure 53. Measurements ex *Motacilla flava feldegg* ($n = 8$): TL = 1.55–1.72; HL = 0.33–0.35; HW = 0.26–0.28; PRW = 0.18–0.19; PTW = 0.26–0.28; AW = 0.31–0.37. Measurements ex *Motacilla flava* ssp. ($n = 7$): TL = 1.58–1.74; HL = 0.32–0.35; HW = 0.25–0.28; PRW = 0.18–0.20; PTW = 0.25–0.29; AW = 0.32–0.36.

Female. Thoracic and abdominal chaetotaxy as in Figure 49. Subgenital plate rounded rectangular, with narrow connection to cross-piece (Fig. 54). Vulval margin gently rounded, with 3 or 4 short, slender *vms* and 3–5 short, thorn-like *vss* on each side; 5 or 6 short, slender *vos* on each side of subgenital plate; distal 1 *vos* median to *vss*. Measurements ex *Motacilla flava feldegg* ($n = 10$): TL = 1.88–2.06 (2.00); HL = 0.35–0.39 (0.37); HW = 0.29–0.32 (0.31); PRW = 0.20–0.22 (0.21); PTW = 0.28–0.32 (0.30); AW = 0.39–0.44 (0.42). Measurements ex *Motacilla flava* ssp. ($n = 20$, except TL, HW and AW where $n = 19$): TL = 1.80–20.8 (1.97); HL = 0.340.38 (0.36); HW = 0.28–0.31 (0.29); PRW = 0.18–0.22 (0.21); PTW = 0.27–0.33 (0.30); AW = 0.39–0.44 (0.41). Measurements ex *Motacilla tschutschensis macronyx* ($n = 1$): TL = 1.89; HL = 0.36; HW = 0.29; PRW = 0.20; PTW = 0.30; AW = 0.40.

Type material. Lectotype ♂, Burgas, Bulgaria, 29 May 1957, F. Balát, 917a (MMBC). **Paralectotypes.** 2♂, 5♀, same data as lectotype, F. Balát, 917a–b, 945a–c



Figures 50–54. *Brueelia kratochvili* Balát, 1958, ex *Motacilla flava* Linnaeus, 1758 **50** Male head, dorsal and ventral views **51** Male genitalia, dorsal view **52** Male mesosome, ventral view **53** Male paramere, dorsal view **54** Female subgenital plate and vulval margin, ventral view.

Figures 48, 49. *Brueelia kratochvili* Balát, 1958, ex *Motacilla flava* Linnaeus, 1758 **48** Male habitus, dorsal and ventral views **49** Female habitus, dorsal and ventral views.

(MMBC). 1♂, 1♀, same data as lectotype, F. Balát, 945d, Brit. Mus. 1958-425 (NHML). 1♀, same data as lectotype, F. Balát (PMSL).

Non-type material. **Ex *Motacilla flava* ssp.:** 4♂, 4♀, Velké Kapušany, Slovakia, 18 Apr. 1959, F. Balát, 1485, 1486, 1487, 1488 (MMBC). 3♂, 14♀, Metkovic, Croatia, 23 Apr. 1963, A. Lesinger, 6285–6290, 8415–8428 (PMSL). 1♂, Dubrovnik, Croatia, 1 Apr. 1968, A. Lesinger, 11420 (PMSL). 1♀, Burgas, Bulgaria, 29 May 1957, F. Balát (PMSL). 1♀, Bharatpur, Rajasthan, India, 4 Oct. 1969, X1E-1006, 24295 on reverse (NHML). 1♀, Muang Bung Boraphet, Nakhon Sawan Province, Thailand, 15 Mar. 1968, X1E-702 (NHML). 2♂, 2♀, Bahig, Egypt, 25 Aug. 1968, OMS-4468 (NHML). 1♀, Mishmar HaNegev [?], Israel, 29 Aug. 1960, 1167-1174, Brit. Mus. 1961-403 (NHML).

Ex *M. tschutschensis macronyx*: 1♀, Bangkok, Thailand, 18 Sep. 1964, H.E. McClure, H-0953 (NHML).

Ex *M. alba*: 2♂, 1♀, Krišovská Liesková - Křížany, Slovakia, 14 Apr. 1959, F. Balát, 1215, 1216, 1217 (MMBC).

Remarks. Balát (1958) did not designate any type specimens, and all specimens he mentioned are therefore syntypes. The words “Type male and female” is handwritten on the label of slide 917a, and we therefore designate the male on this slide as the lectotype (this male has been marked with a dark spot on the slide); all other specimens mentioned by Balát (1958) thus become paralectotypes. All material is present at the MMBC except for the slides at the NHML and PSML listed above, as well as a slide with a single male we have been unable to trace; it should be regarded as lost.

In addition, there are two slides at MMBC (1485 and 1486) marked ‘Type male’ and ‘Type female’ on the labels. However, these were collected a year after the publication of *B. kratochvili*, and can thus not be part of the type series. The slides from *Motacilla alba* are also labeled “Type male” (slide no. 1215), “Paratype male” (slide no. 1216), and “Type female” (slide no. 1217), but

no species name based on these specimens have ever been published. The specimens from *Motacilla alba* are here deemed to be conspecific with *M. kratochvili* from *M. flava*. There are no significant differences in head shape, male genitalia, or abdominal chaetotaxy between material from the two host species, but females from *M. alba* have slightly different vulval chaetotaxy from that described above (4 *vos*, 3 or 4 *vms*, 5–7 *vos* on each side). These setal numbers overlap, and we therefore consider *M. alba* to be a new host record of *B. kratochvili*.

Notably, specimens from Asian subspecies of *M. alba* we have seen differ from the present material in the extent of head pigmentation, the male abdominal chaetotaxy, and the shape of the male genitalia, including both the parameres and the mesosome. These populations may represent a different species of *Brueelia*, and are not included under *B. kratochvili* here.

Brueelia rosickyi Balát, 1955

Figs 55–61

Brueelia rosickyi Balát, 1955: 517.

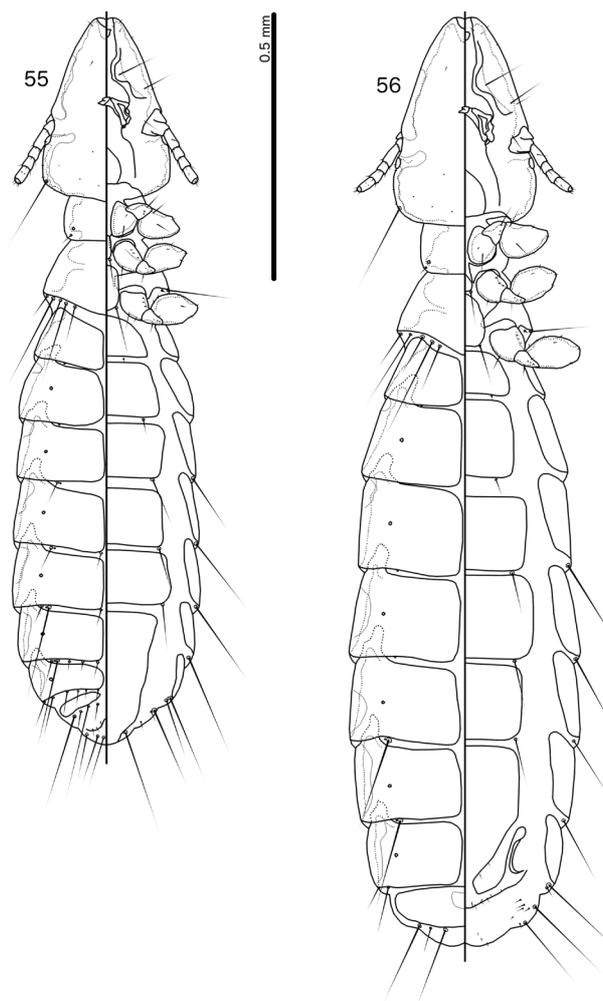
Type host. *Sylvia nisoria* (Bechstein, 1792), barred warbler (Sylviidae).

Type locality. Těšice u Hodonína, Czechia.

Description. Both sexes. Head slender, rounded triangular (Fig. 57), lateral margins of preantennal area convex, frons narrowly concave. Marginal carina slender, deeply displaced at osculum, median margin slightly undulating. Ventral anterior plate not visible. Head chaetotaxy and pigmentation patterns as in Figure 57. Preantennal nodi not bulging. Pre- and postocular nodi small, of roughly similar size. Marginal temporal carina of moderate width, median margin undulating. Gular plate broadly lanceolate. Thoracic and abdominal segments and pigmentation patterns as in Figures 55, 56.

Male. Thoracic and abdominal chaetotaxy as in Figure 55. Basal apodeme widening distally, with lateral margins slightly concave at mid-point (Fig. 58). Proximal mesosome large, trapezoidal with slightly concave lateral margins (Fig. 59). Mesosomal lobes slender, converging distally; rugose area extensive along distal margin. Parameres slender, elongated (Fig. 60); *pst1*–2 as in Figure 60. Measurements ($n = 3$): TL = 1.28–1.36; HL = 0.33–0.35; HW = 0.22–0.24; PRW = 0.15–0.16; PTW = 0.23–0.24; AW = 0.33–0.35.

Female. Thoracic and abdominal chaetotaxy as in Figure 56. Subgenital plate pentagonal, with narrow connection to cross-piece (Fig. 61). Vulval margin convergent to rounded median point, with 3–5 short, slender *vms* and 3 or 4 short, thorn-like *vss* on each side; 2 or 3 short, slender *vos* on each side of subgenital plate; distal 1 *vos* median to *vss*. Measurements ($n = 17$): TL = 1.57–1.77 (1.66); HL = 0.36–0.38 (0.37); HW = 0.25–0.28 (0.26); PRW = 0.16–0.18 (0.17); PTW = 0.25–0.28 (0.26); AW = 0.36–0.42 (0.39).

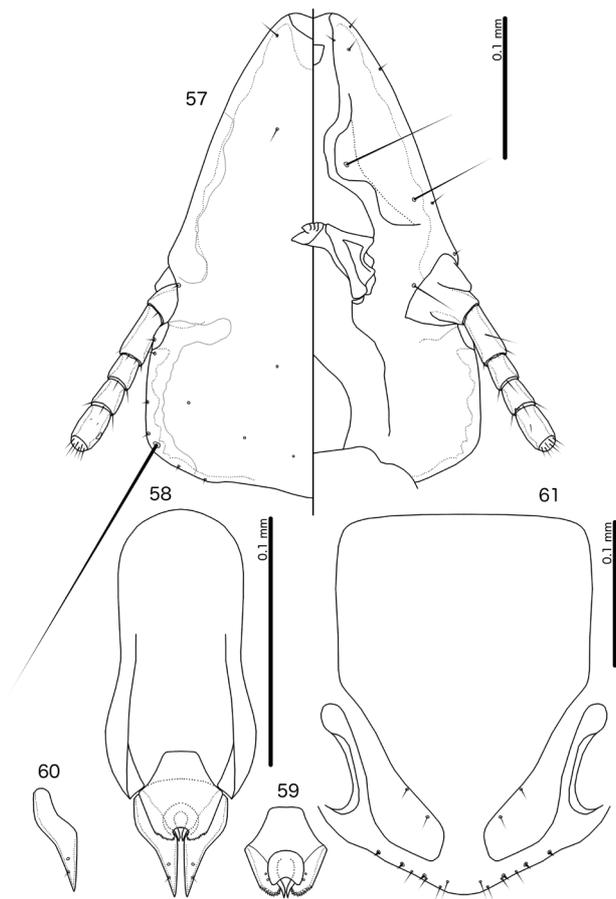


Figures 55, 56. *Brueelia rosickyi* Balát, 1955, ex *Sylvia nisoria* (Bechstein, 1792) **55** Male habitus, dorsal and ventral views **56** Female habitus, dorsal and ventral views.

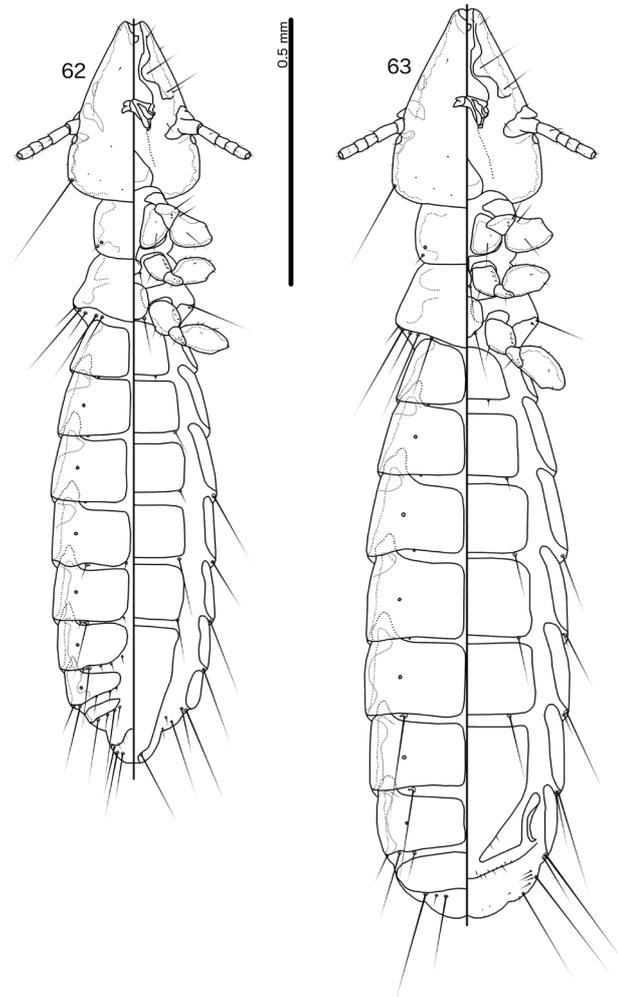
Type material. Lectotype ♂, Těšice u Hodonína, Czechia, 15 May 1953, F. Balát, 1133a (MMBC). **Paralectotype.** 1♀, same data as lectotype, 1133b (MMBC).

Non-type material. 1♂, 14♀, same data as lectotype, F. Balát, 1133c–q (MMBC). 1♂, 2♀, Járók u Nitry, Slovakia, 17 June 1953, F. Balát, 1070 (MMBC). 1♀, Liteň, Czechia, 19 May 1938, K. Pflieger (MMBC).

Remarks. Balát (1955) did not designate any holotype, but mentioned a male and a female as “types”; these two specimens comprise the syntype series. The specimens on slides 1133a and 1133b are marked accordingly in handwriting, and the male is here designated the lectotype with the female becoming the paralectotype. All other specimens mentioned by Balát as additional specimens have no type status. Slide 1133d is marked “allotype female” and slides 1133e–n are marked “paratypes”, but this does not seem to be in Balát’s hand. Presently, 20 slides with a total of four males and 18 females are deposited at the MMBC. We have been unable to trace the remaining one male and three females and consider them to be lost.



Figures 57–61. *Brueelia rosickyi* Balát, 1955, ex *Sylvia nisoria* (Bechstein, 1792) **57** Male head, dorsal and ventral views **58** Male genitalia, dorsal view **59** Male mesosome, ventral view **60** Male paramere, dorsal view **61** Female subgenital plate and vulval margin, ventral view.



Figures 62–63. *Brueelia vaneki* Balát, 1981, ex *Acrocephalus schoenobaenus* (Linnaeus, 1758) **62** Male habitus, dorsal and ventral views **63** Female habitus, dorsal and ventral views.

Brueelia vaneki Balát, 1981

Figs 62–68

Brueelia vaneki Balát, 1981: 277.

Type host. *Acrocephalus schoenobaenus* (Linnaeus, 1758), sedge warbler (Acrocephalidae).

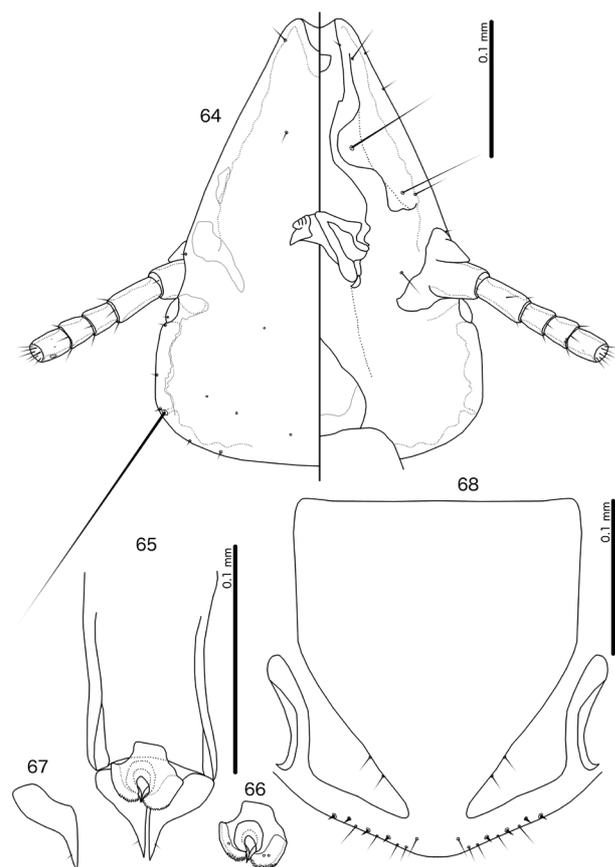
Type locality. Velký Dvůr u Pohořelic, Czechia.

Description. Both sexes. Head elongated, rounded-trapezoidal (Fig. 64), lateral margins of preantennal area convex proximally and concave distally, frons narrowly concave. Marginal carina moderate in width, with undulating median margin, deeply displaced at osculum. Ventral anterior plate small, shield-shaped. Head chaetotaxy and pigmentation patterns as in Figure 64. Preantennal nodi not bulging. Pre- and postocular nodi of roughly equal size. Marginal temporal carina of moderate width, median margin undulating. Gular plate lanceolate. Thoracic and abdominal segments and pigmentation patterns as in Figures 62 and 63.

Male. Thoracic and abdominal chaetotaxy as in Figure 62. Male genitalia slightly distorted, and proximal

mesosome not clearly visible; here illustrated in dorso-lateral view as seen in single examined specimen. Basal apodeme broad, anterior end not visible in specimen (Fig. 65). Proximal mesosome seemingly broad and trapezoidal (Fig. 66). Mesosomal lobes broad, rounded; rugose area extensive along distal margin. Gonopore distorted, but seemingly semi-oval, about as wide as long. Parameres slender, elongated distally (Fig. 67); only *pst1* visible in specimen, as in Figure 67. Measurements ($n = 1$): TL = 1.40; HL = 0.34; HW = 0.25; PRW = 0.16; PTW = 0.23; AW = 0.31.

Female. Thoracic and abdominal chaetotaxy as in Figure 63; holotype has 5 *mms* on one side and 7 *mms* on the other; we have here illustrated only 5, as this is the normal amount in *Brueelia* and the number found in the examined non-type females. Female subgenital plate is almost completely translucent and exact limits very hard to ascertain; apparently broadly pentagonal, with connection to cross-piece moderate in width (Fig. 68). Vulval margin rounded, with slight bulge in median section; 3



Figures 64–68. *Brueelia vaneki* Balát, 1981, ex *Acrocephalus schoenobaenus* (Linnaeus, 1758) **64** Male head, dorsal and ventral views **65** Male genitalia, dorsal view, except mesosome which is distorted in specimen and here drawn in dorso-lateral view **66** Male mesosome, ventro-lateral view **67** Male paramere, dorsal view **68** Female subgenital plate and vulval margin, ventral view.

or 4 short, slender *vms* and 3 or 4 short, thorn-like *vss* on each side; 3 short, slender *vos* on each side of subgenital plate; distal 1 *vos* median to or only slightly anterior to *vss*. Measurements ($n = 2$): TL = 1.42–1.72; HL = 0.34–0.38; HW = 0.25–0.27; PRW = 0.17–0.19; PTW = 0.24–0.26; AW = 0.34–0.39.

Type material. **Holotype** ♀, Velký Dvůr u Pohořelice, Czechia, 18 June 1978, F. Balát, 1519 (MMBC). **Paratypes.** 1♂, same data as holotype, F. Balát, 1507 (MMBC). 2♀, Hodonín, Czechia, Aug. 1951, F. Balát, 614 (MMBC).

Remarks. Balát (1981) explicitly designated a holotype (female on slide 1519), which is also marked accordingly on the label in handwriting. All other specimens were explicitly designated paratypes. Presently, there are four slides with this material at the MMBC, comprising one male and three females; the remaining two males and two nymphs mentioned by Balát are not in the MMBC, and must be regarded as lost. In addition, slide 1520, which supposedly contained a male of this species, is empty.

Brueelia matvejevi Balát, 1981

Figs 69–75

Brueelia matvejevi Balát, 1981: 278.

Type host. *Turdus viscivorus* Linnaeus, 1758, mistle thrush (Turdidae).

Type locality. Zabljak, Montenegro.

Description. **Both sexes.** Head flat dome-shaped (Fig. 71), lateral margins of preantennal area convex, frons flat to slightly concave. Marginal carina moderate in width, median margin slightly undulating, deeply displaced and widened at osculum. Ventral anterior plate small, shield-shaped with concave anterior margin. Head chaetotaxy and pigmentation patterns as in Figure 71; pigmentation very uniform, and difference between different areas slight. Preantennal nodi slightly bulging. Pre- and postocular nodi large. Marginal temporal carina wide, with undulating median margin. Gular plate broad, with concave lateral margins. Thoracic and abdominal segments as in Figures 69 and 70. Thoracic and abdominal pigmentation more or less uniform, and not denoted in Figures 69, 70.

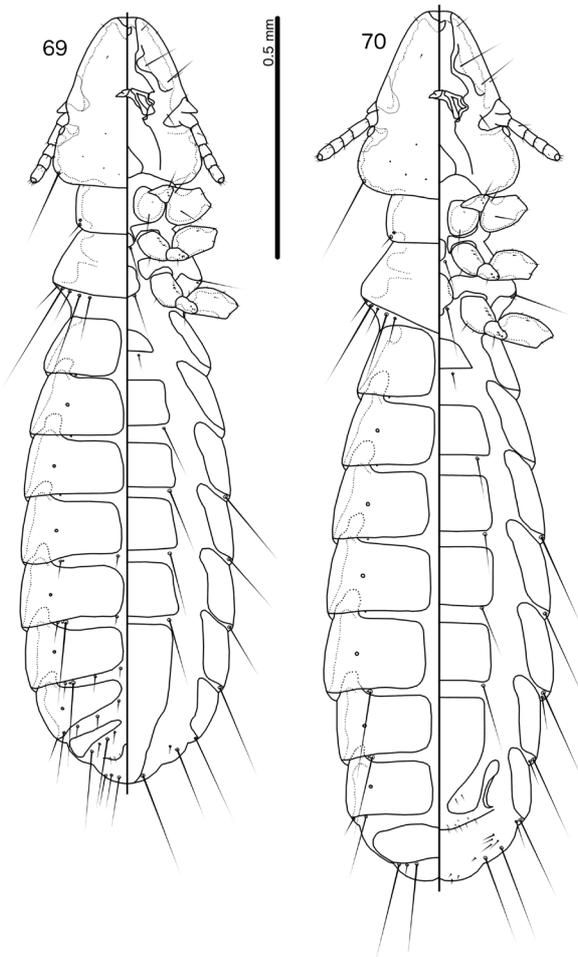
Male. Thoracic and abdominal chaetotaxy as in Figure 69; *aps* on tergopleurites V–VI absent in some specimens, and only present on one side of tergopleurite VI in holotype. Basal apodeme with shallowly concave lateral margins (Fig. 72). Proximal mesosome as in Figure 73. Mesosomal lobes wide, converging distally, with extensive rugose area in distal end. Gonopore large, crescent-shaped. Parameres stout, elongated distally (Fig. 74); *pst1–s* as in Figure 74. Measurements ($n = 12$): TL = 1.47–1.64 (1.56); HL = 0.33–0.37 (0.35); HW = 0.28–0.32 (0.30); PRW = 0.19–0.22 (0.21); PTW = 0.28–0.31 (0.30); AW = 0.37–0.44 (0.41).

Female. Thoracic and abdominal chaetotaxy as in Figure 70. Subgenital plate rounded pentagonal (Fig. 75), with connection to cross-piece moderate in width. Vulval margin gently rounded to flattened medianly, with 4 or 5 short, slender *vms* and 2 or 3 short, thorn-like *vss* on each side; 3 or 4 short, slender *vos* on each side of subgenital plate; distal 1 *vos* median to *vss*. Measurements ($n = 15$): TL = 1.53–1.93 (1.73); HL = 0.35–0.41 (0.38); HW = 0.28–0.35 (0.32); PRW = 0.20–0.24 (0.22); PTW = 0.28–0.35 (0.32); AW = 0.40–0.51 (0.46).

Type material. **Holotype** ♂, Žabljak, Montenegro, 3 July 1958, S. Brelih (6342), F.B. 1523. **Paratypes.** 1♀ same collection data as holotype, S. Brelih (6344), F.B. 1524. 3♂, 1♀ Brno – Obora, Czechia, 15 Jun. 1954, F. Balát, 1416, 1417a, b, 1419.

Non-types examined. **Ex *Turdus viscivorus viscivorus*:** 2♂, 2♀, Crno Jez, Durmitor, Montenegro, 8 July 1958, S. Brelih, 333, 1990, 1992–1993 (PMSL); 6♂, 10♀, Crno Jez, Durmitor, Montenegro, 3 July 1958, S. Brelih, 428–429, 628–629, 1997–1998, 6338–6339, 6341, 6343, 6345–6347, 6350–6352 (PMSL); 1♀, Crna Gora, Zabljak, Montenegro, 1 Mar. 1958, S. Brelih (NHML).

Remarks. Balát (1981) explicitly designated the male on slide 1523 (Brelih's collection number 6342) as the holotype, and this is confirmed by the handwritten note on



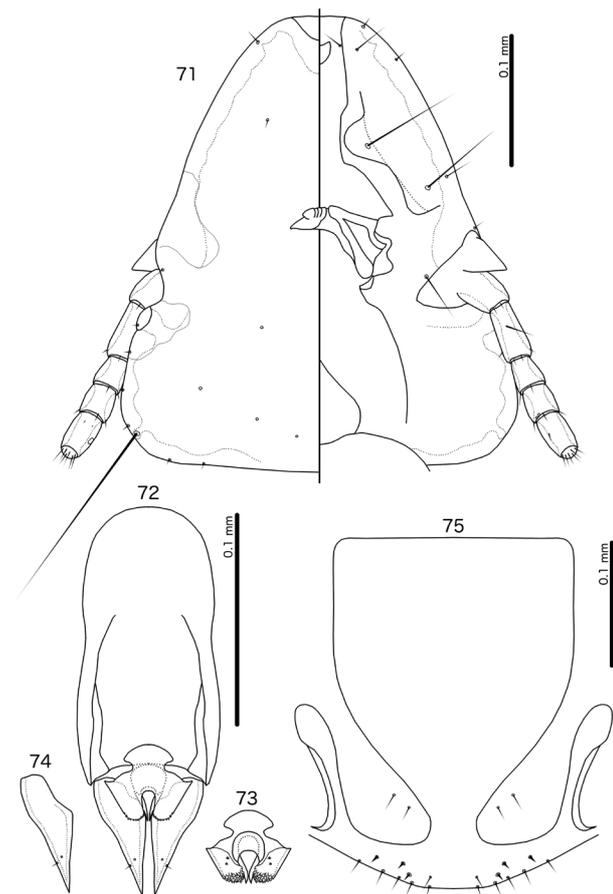
Figures 69, 70. *Brueelia matvejevi* Balát, 1981, ex *Turdus viscivorus* Linnaeus, 1758 **69** Male habitus, dorsal and ventral views **70** Female habitus, dorsal and ventral views.

the slide label. Another female from the same host specimen (slide no. 1524; Brelih's collection number 6344), and 20 males, 26 females, and 6 nymphs were designated as paratypes. Presently, six slides with the holotype and five paratypes are at the MMBC. All other specimens are missing from the MMBC, and must be regarded as lost.

Guimaraesiella Eichler, 1949

Nirmus Nitzsch, 1818: 291 (*in partim*).
Degeeriella Neumann, 1906: 60 (*in partim*).
Brueelia Kéler, 1936: 257 (*in partim*).
Xobugirado Eichler 1949: 13.
Allobrueelia Eichler, 1951: 36 (*in partim*).
Allobrueelia Eichler, 1952: 74 (near-verbatim redescription).
Allonirmus Złotorzycka, 1964: 263.
Nitzschnirmus Mey & Barker, 2014: 101.

Type species. *Docophorus subalbicans* Piaget, 1885: 6 [= *Docophorus papuanus* Giebel, 1879: 475], by original designation.



Figures 71–75. *Brueelia matvejevi* Balát, 1981, ex *Turdus viscivorus* Linnaeus, 1758. **71** Male head, dorsal and ventral views **72** Male genitalia, dorsal view **73** Male mesosome, ventro-lateral view **74** Male paramere, dorsal view **75** Female subgenital plate and vulval margin, ventral view.

Guimaraesiella haftorni (Balát, 1981)

Figs 76–82

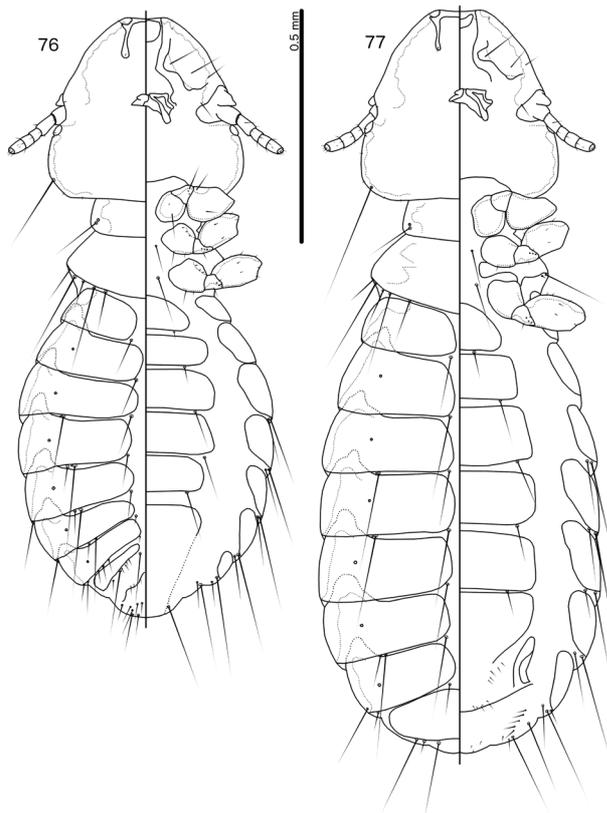
Allobrueelia haftorni Balát, 1981: 280.

Guimaraesiella haftorni (Balát, 1981); Gustafsson and Bush 2017: 222.

Type host. *Turdus iliacus* Linnaeus, 1758. redwing (Turdidae).

Type locality. Sokolnice, Czechia.

Description. Both sexes. Head broad, rounded dome-shaped (Fig. 78), lateral margins of preantennal head convex, frons broadly concave. Marginal carina broad, with undulating median margin. Dorsal and ventral anterior plates and exact extent of dorsal preantennal suture not clear in examined specimens, and illustrated tentatively. Head chaetotaxy as in Figure 78. Preantennal nodi bulging. Pre- and postocular nodi of roughly equal size. Marginal temporal carina of moderate width, median margin undulating slightly. Gular plate not visible in examined material, and not illustrat-

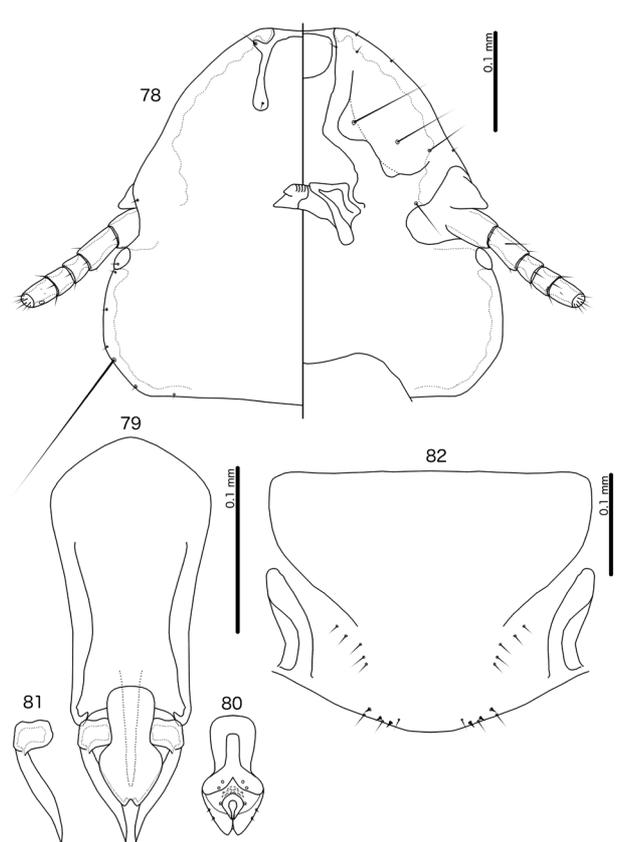


Figures 76, 77. *Guimaraesiella haftorni* (Balát, 1958) ex *Turdus iliacus* Linnaeus, 1758. **76** Male habitus, dorsal and ventral views **77** Female habitus, dorsal and ventral views.

ed. Thoracic and abdominal segments as in Figures 76 and 77. Pigmentation artificially altered, and true pigmentation patterns unknown.

Male. Thoracic and abdominal chaetotaxy as in Figure 76. Basal apodeme widening proximally, with slightly concave lateral margins (Fig. 79). Proximal mesosome widening slightly proximally (Fig. 80). Ventral sclerite rectangular, slender. Mesosomal lobes slender, convergent distally, seemingly not fused in distal end. Mesosomal chaetotaxy as in Figure 80. Moderate rugose area anterior to reverse drop-shaped gonopore. Parameral heads roughly widely rectangular (Fig. 81); parameral blades slender, elongated; *pst1*–2 not visible in specimens. Measurements ($n = 2$): TL = 1.25–1.26; HL = 0.37–0.38; HW = 0.39–0.41; PRW = 0.24; PTW = 0.32–0.35; AW = 0.51–0.52.

Female. Thoracic and abdominal chaetotaxy as in Figure 77. Holotype with 5 *mms* on one side, and 7 *mms* on the other; we here illustrated only 5, which is the typical number in *Guimaraesiella*. Tergopleurite VI without post-spiracular setae in holotype, but this is likely an anomaly as these setae occur in all other *Guimaraesiella*; *ss* on tergopleurite VIII only present on one side. Subgenital plate not clear in specimen, seemingly wide anteriorly (Fig. 82); distal shape unknown. Vulval margin gently rounded, somewhat flattened medianly, with 2 short, slender *vms* and 2 or 3 short, thorn-like *vss* on each



Figures 78–82. *Guimaraesiella haftorni* (Balát, 1958) ex *Turdus iliacus* Linnaeus, 1758 **78** Male head, dorsal and ventral views **79** Male genitalia, dorsal view **80** Male mesosome, ventral view **81** Male paramere, dorsal view **82** Female subgenital plate and vulval margin, ventral view.

side; 4–6 short, slender *vos* on each side of subgenital plate; distal 1 *vos* median to *vss*. Measurements ($n = 1$): TL = 1.71; HL = 0.44; HW = 0.47; PRW = 0.28; PTW = 0.42; AW = 0.64.

Type material. **Holotype** ♀, Sokolnice, Czechia, 1 Apr. 1958, F. Balát, 1242 (MMBC). **Paratypes.** 2♂, same collection data as holotype, F. Balát, 1240, 1241 (MMBC).

Remarks. Balát (1981) explicitly designated the female on slide 1242 as the holotype, and the specimens on slides 1240 and 1241 as paratypes. This is confirmed by the handwritten notes on the slide labels. All specimens are present in the MMBC. Balát (1981) stated that both paratype males were immature. This is incorrect, as both males are adult. However, all three known specimens are poorly cleared, and many details cannot be seen properly, including the meso- and metasterna, metepisterna, proepimera, the gular plate, many leg setae, and the distal section of the subgenital plate of both sexes. More specimens of *G. haftorni* are needed to completely redescribe and reillustrate this species.

The *Guimaraesiella* of European thrushes are all morphologically very similar, differing mainly in the male genitalia and the head shape. Moreover, we have seen

some specimens of *Guimaraesiella* from non-type host species in European material (D. Gustafsson unpublished data). Unless these records are the result of contamination or misidentification of the host, this may suggest that at least some European species of *Guimaraesiella* occur on more than one host species. Relying on host relationships to obtain the species identity of *Guimaraesiella* samples from thrushes may thus be unreliable. However, almost all species of *Guimaraesiella*, including those from thrushes, are poorly described, and presently unidentifiable. Redescriptions of *Guimaraesiella amsel* (Eichler, 1951), *Guimaraesiella marginata* (Burmeister, 1838), *Guimaraesiella turdinulae* (Ansari, 1956), and *Guimaraesiella viscivori* (Denny, 1842) are urgently needed to establish the species limits in this group.

Guimaraesiella lais (Giebel, 1874)

Figs 83–89

Nirmus Giebel, 1866: 366 [species 25].

Nirmus lais Giebel, 1874: 143.

Degeeriella lais Giebel, 1874; Harrison 1916: 116.

Brueelia lais (Giebel), 1874; Hopkins and Clay 1952: 57.

Brueelia (Allobrueelia) lais (Giebel); Balát 1955: 503.

Allonirmus lais (Gieb.); Złotorzycka 1977: 45.

Guimaraesiella lais (Giebel, 1874); Gustafsson and Bush 2017: 222.

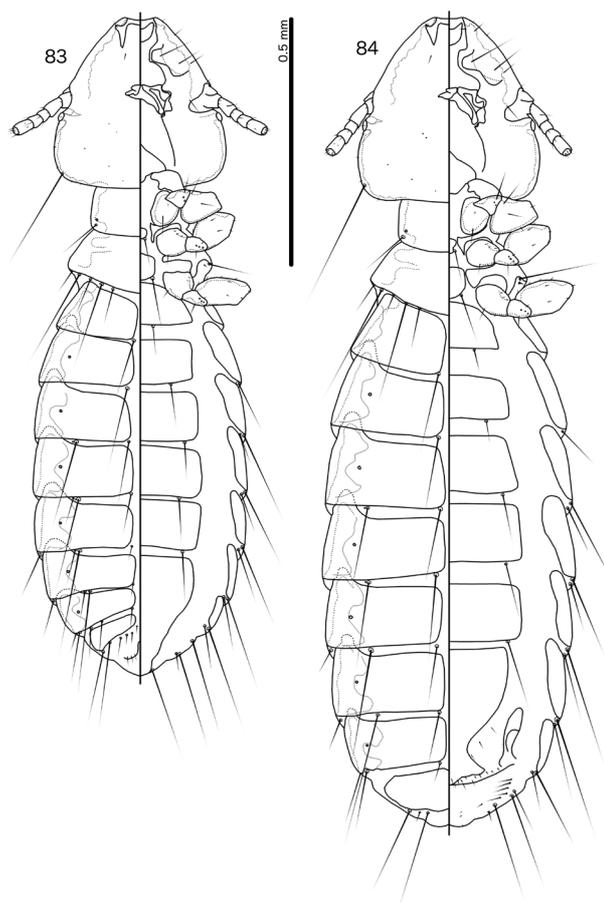
Allobrueelia lais (Giebel, 1874); Mey 2017: 177.

Type host. *Luscinia megarhynchos* (Brehm, 1831), common nightingale (Muscicapidae).

Type locality. None given in original, but likely Germany. Neotype (designated herein) is from Nejdek u Lednice, Czechia.

Description. Both sexes. Head broad, rounded pentagonal (Fig. 85), lateral margins of preantennal area convex, frons broadly concave. Marginal carina moderate in width, with undulating median margin. Exact posterior extent of dorsal preantennal suture not clear in examined specimens, but suture does not appear to reach *ads*. Ventral anterior plate with deeply concave anterior margin. Head chaetotaxy and pigmentation patterns as in Figure 85; pigmentation of preantennal head rather uniform. Preantennal nodi with slight median bulge. Preocular nodi larger than postocular nodi. Marginal temporal carina thin, of more or less equal width. Gular plate short, broad, with median point. Thoracic and abdominal segments and pigmentation patterns as in Figures 83, 84.

Male. Sternites II–IV partially ruptured and displaced in neotype, and here illustrated approximately. Thoracic and abdominal chaetotaxy as in Figure 83; neotype has no setae on dorsal side of abdominal segment XI, but this is likely an anomaly. Male genitalia partially obscured by gut content. Basal apodeme widens proximally, with slightly concave lateral margins in distal half (Fig. 86). Proximal mesosome widening proximally, with concave lateral margins (Fig. 87). Ventral sclerite obscured by gut



Figures 83, 84. *Guimaraesiella lais* (Giebel, 1874) ex *Luscinia megarhynchos* (Brehm, 1831) **83** Male habitus, dorsal and ventral views **84** Female habitus, dorsal and ventral views.

content, and illustrated approximately; seemingly narrowly rectangular. Mesosomal lobes slender, converging in distal end, fused distally. Mesosomal chaetotaxy as in Figure. 87. Rugose area absent. Gonopore almost terminal, semi-oval. Parameral heads large (Fig. 88), parameral blades of approximately uniform width in proximal half, tapering in distal half, with *pst1–2* as in Figure 81. Measurements ($n = 1$): TL = 1.32; HL = 0.34; HW = 0.33; PRW = 0.21; PTW = 0.30; AW = 0.43.

Female. Thoracic and abdominal chaetotaxy as in Figure 84. Examined specimens poorly cleared, and exact shape of distal subgenital plate not clear, and here illustrated as accurately as possible; seemingly rounded-triangular, with broad distal section, including wide lateral submarginal bulges (Fig. 89). Vulval margin flattened medianly, with 3 or 4 short, slender *vms* and 8 short, thorn-like *vss* on each side; 3 or 4 short, slender *vos* on each side of subgenital plate; distal 1 *vos* median to *vss*. Measurements ($n = 3$): TL = 1.61–1.66; HL = 0.36–0.38; HW = 0.35–0.37; PRW = 0.21–0.22; PTW = 0.31–0.34; AW = 0.46–0.51.

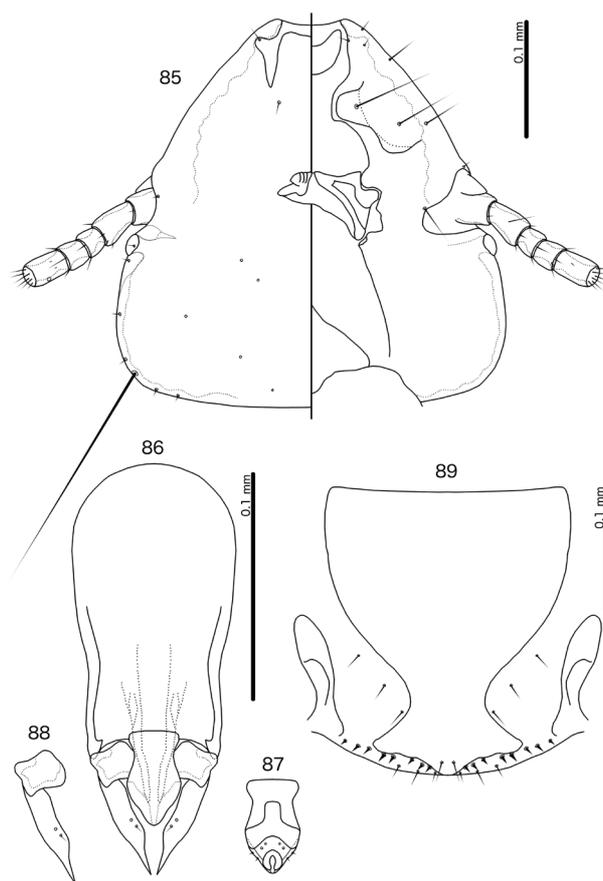
Type material. Neotype 1♂, Nejdek u Lednice, Czechia, 6 May 1953, F. Balát, 1114 (MMBC). Neoparatypes: 3♀, same data as neotype, 1113, 1114 (MMBC).

Remarks. Gustafsson and Bush (2017) included *Nirmus lais* Giebel, 1874, in *Guimaraesiella* Eichler, 1949, without comment; they did not examine any specimens of this species. The placement of this species in *Guimaraesiella* followed Balát (1955), who placed it in *Allobrueelia* Eichler, 1951, a synonym of *Guimaraesiella*, and Złotorzycka (1977), who placed it in *Allonirmus* Złotorzycka, 1964, also a synonym of *Guimaraesiella*. However, they overlooked that Giebel (1874) stated that this species was close to *Nirmus intermedius* Nitzsch [in Giebel], 1866, which Gustafsson and Bush (2017) placed in *Brueelia* Kéler, 1936. This apparent contradiction requires some additional discussion.

Giebel's description of *N. lais* was based on a single female, and does not contain any specific character that can be used to place *N. lais* in either *Brueelia* or *Guimaraesiella* with certainty. Giebel (1874) did not illustrate this species. Giebel (1866) recorded lice from the same host merely as "*N. ...*" [species 25 under the genus *Nirmus*], but lists specimens from *Erithacus rubecula* (Linnaeus, 1758) under the same heading; the lice from *E. rubecula* were later (Giebel 1874) described as *Nirmus tristis* Giebel, 1874, which was also placed in *Guimaraesiella* in the revision of Gustafsson and Bush (2017).

Giebel's (1874) statement that *N. lais* is similar to *N. intermedius* is unreliable, as his other statements about similarity between louse species are often confusing. For instance, on the page before the description of *N. lais*, Giebel (1874: 142) stated that *Nirmus intermedius* is similar to *Nirmus ruficeps* Nitzsch [in Giebel], 1866, and *N. limbatus* Burmeister, 1838. The former species is a head louse, now placed in the genus *Rostrinirmus* Złotorzycka, 1964, whereas the latter is an uncommonly wide-headed and large-bodied member of *Brueelia* s. str. *Brueelia intermedia*, by contrast, is a slender-headed species of *Brueelia*, quite unlike both *N. ruficeps* and *N. limbatus*. This issue is further confused by Giebel's statement that *N. intermedius* is similar to *N. merulensis* Denny, 1842, differing only in the proportions of the antennae and the prothorax. Gustafsson and Bush (2017) placed *N. merulensis* in the genus *Turdinirmus* Eichler, 1951, a genus superficially similar to *Guimaraesiella*, but very different from species of *Brueelia* known from thrushes in size, head shape, and head structure. It is therefore not at all clear what specimens Giebel actually examined, and what he means by "similar".

Apart from the specimens listed here, we have been unable to locate any specimens of *Brueelia*-complex lice from *L. megarhynchus* in any of the museum collections we have searched (see list in Gustafsson and Bush 2017). In particular, Giebel's original specimen appears to have been destroyed in the war (Clay and Hopkins 1955). Moreover, Balát's (1955) report appears to be the only subsequent report of any species of louse in the *Brueelia*-complex from *L. megarhynchus*. Eichler [in Niethammer] (1937; not seen) and Séguy (1944) reported *N. lais* from *Luscinia luscinia* (Linnaeus, 1758); we have not seen these specimens. It is not clear from Séguy's



Figures 85–89. *Guimaraesiella lais* (Giebel, 1874) ex *Luscinia megarhynchus* (Brehm, 1831) **85** Male head, dorsal and ventral views **86** Male genitalia, dorsal view **87** Male mesosome, ventral view **88** Male paramere, dorsal view **89** Female subgenital plate and vulval margin, ventral view.

(1944) short description whether his specimens represent the same species as Giebel's *N. lais*, or whether this identity is assumed based on the close relationship between the host species.

Złotorzycka (1977: figs 149–152) illustrated the head, ventral anterior plate, male genitalia, and pleurites of *N. lais*, but indicated that this species was not known from Poland (ibid.: 10). It is therefore uncertain where the material she based her illustration on originated, nor where this specimen is located today. Złotorzycka's illustrations are rarely very informative, especially those of male genitalia. However, the specimens we have examined are largely concordant with the illustrations of Złotorzycka (1977).

To stabilize the nomenclature of the lice found on thrushes and flycatchers, we here designate a neotype for *Nirmus lais* Giebel, 1874, from Balát's specimens. These specimens all belong to *Guimaraesiella* (sensu Gustafsson and Bush 2017), and our neotype designation thus conforms to the placement of this species in *Guimaraesiella* by Gustafsson and Bush (2017), in *Allobrueelia* [= *Guimaraesiella*] by Balát (1955) and Mey (2017), and in *Allonirmus* by Złotorzycka (1977). More-

over, this conforms to Giebel's (1866) earlier placement of Nitzsch's material from *L. luscinola* [= *L. megarhynchos*; but given as *Sylvia luscinia* by Giebel (1866)] with his material from *E. rubecula*, which represents *Guimaraesiella tristis*.

***Guimaraesiella tovoornikae* (Balát, 1981)**

Allonirmus tovoornikae Balát, 1981: 281.

Nigrionirmus atricapillae Soler-Cruz et al., 1984: 147.

Brueelia atricapillae Soler-Cruz et al., 1984; Price et al. 2003: 153 (nec *B. atricapilla* Cicchino, 1983: 290).

Brueelia neoatricapillae Price, Hellenthal & Palma, 2003 [in Price et al.: 153].

Guimaraesiella tovoornikae (Balát, 1981); Gustafsson and Bush 2017: 222.

Type host. *Sylvia atricapilla* (Linnaeus, 1758), blackcap (Sylviidae).

Type locality. Antošovice, Czechia.

Remarks. Balát (1981) reported four males and three females of this species from three localities in Czechia and Yugoslavia. The male on slide 1383 was explicitly designated as holotype, and the other specimens as paratypes. Unfortunately, these slides cannot be found at the MMBC, and we have been unable to trace them elsewhere. The type material of this species must be regarded as lost.

This is unfortunate, as *A. tovoornikae* is considered to be a senior synonym of *Nigrionirmus atricapillae* Soler-Cruz et al., 1984, from the same host (Gustafsson and Bush 2017). While this synonymy should not be controversial, considering the morphological similarities of the two species, any neotype designation for *A. tovoornikae* will need to take the synonymy with *N. atricapillae* into consideration. For this, fresh material is needed.

Discussion

Dalgleish and Price (2003) stated that the only way to realistically deal with a super-species-rich genus like *Myrsidea* Waterston, 1915, is to circumscribe each revision to species of lice from the same host family; this practice is generally followed by taxonomists working on *Myrsidea* (e.g., Price and Johnson 2006, Sychra and Literák 2008, Kounek et al. 2011). Taken as a whole, the *Brueelia*-complex is more species-rich than *Myrsidea*, and the host range of the *Brueelia*-complex is similar to that of the genus *Myrsidea*. Any approach likely to make species identification and description within the *Brueelia*-complex easier is thus appealing. Is the approach used for *Myrsidea* then applicable to the *Brueelia*-complex as well?

In a wider perspective, using this approach in the *Brueelia*-complex is not without problems. Gustafsson and Bush (2015) and Gustafsson et al. (2018b) showed

several examples of morphologically similar species of *Brueelia* occurring on different host families, and, conversely, species of *Brueelia* occurring on the same host family being morphologically different.

The species redescribed here show similar patterns. Most taxa treated here are fairly typical species for their respective host families. For instance, both *B. ferianci* and *B. kratochvili* have the head shape typical of *Brueelia* species parasitizing boreal (but not tropical or southern; Gustafsson and Bush in prep.) motacillids. The extensive dark pigmentation patterns of *B. breueri* are also typical of the species of *Brueelia* parasitizing many boreal fringillids.

However, the head shape of *B. blagovescenskyi* (Fig. 4) is more similar to *Brueelia* species on boreal motacillids (e.g., Fig. 50) than it is to *B. pelikani* from another emberizid host (Fig. 8). The same head shape is found in some undescribed species from cisticolid hosts (Gustafsson and Bush in prep.). Similarly, the lack of *aps* on male tergo-pleurites VI–VII in *B. glizi* (Fig. 20) is more similar to some species of *Brueelia* on North American passerellids (Gustafsson and Bush in prep.) than it is to any species of *Brueelia* known from fringillids.

Descriptions of new species in large genera like *Brueelia* and *Guimaraesiella* thus need to be done with caution, as the close relatives may parasitize different host families (Gustafsson and Bush 2015, Bush et al. 2016). A simple comparison of a potential new louse species with only species found on the same host family may therefore not be sufficient. Unfortunately, of the 426 species of lice in this complex recognized by Gustafsson and Bush (2017; additional species have since been described by Mey 2017, Gustafsson et al. 2018a, b, c, 2019), less than half are identifiable from their original descriptions. Moreover, there are no published suggestions for species groups in *Brueelia* and *Guimaraesiella* to consult. Apart from species description and illustration, future taxonomic work on the *Brueelia*-complex should include attempts to delimit species groups within the larger genera of the complex (*Brueelia*, *Guimaraesiella*). In addition, it is vital that more already described species within this complex are examined critically and redescribed whenever possible.

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