



<http://dx.doi.org/10.11646/zootaxa.4013.4.2>

<http://zoobank.org/urn:lsid:zoobank.org:pub:E573E443-9D0B-4582-B8E2-CADFC03C1A1E>

## Four new species of *Brueelia* Kéler, 1936 (Phthiraptera: Ischnocera: Philopteridae) from African songbirds (Passeriformes: Sturnidae and Laniidae)

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### Abstract

Four new species in the louse genus *Brueelia* Kéler, 1936 are described from African hosts of the families Sturnidae and Laniidae. They are: *Brueelia rigbyi* n. sp. ex *Corvinella melanoleuca* (Jardine, 1831), *B. clara* n. sp. ex *Lamprotornis australis* (A. Smith, 1836), *B. tkachi* n. sp. ex *Spreo albicapillus albicapillus* Blyth, 1856, and *B. coryliventer* n. sp. ex *Creatophora cinerea* (Meuschen, 1787). These four species are characterized by a unique abdominal chaetotaxy and a sinuous thickening of the distal margin of the male mesosome. These four species are very similar, and we consider them to form one species group. A key to the species of the group is provided.

**Key words:** Phthiraptera, Ischnocera, Philopteridae, Sturnidae, Laniidae, *Brueelia*, new species, Africa

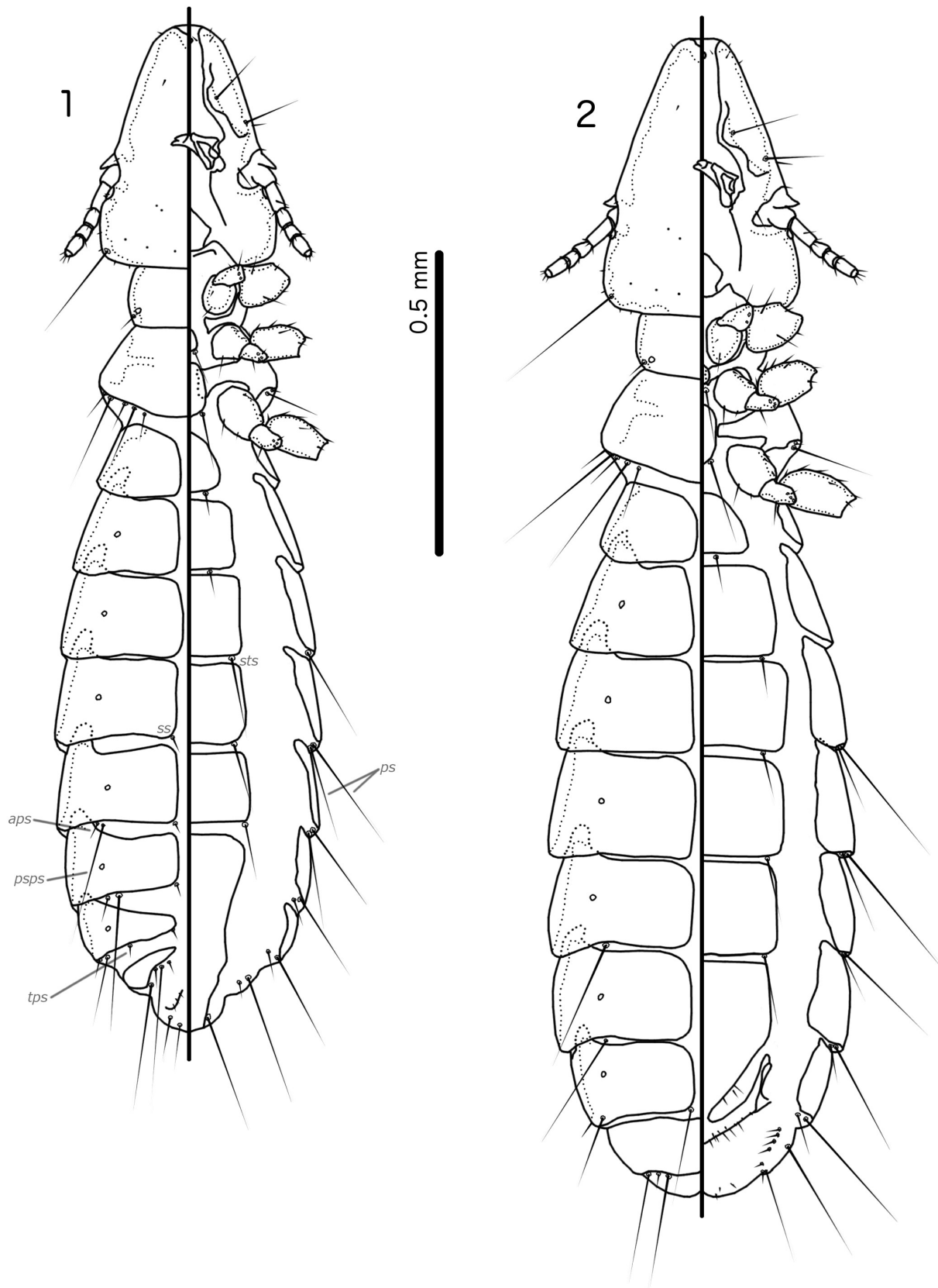
### Introduction

The genus *Brueelia* Kéler, 1936 occurs primarily on songbirds, and is one of the most speciose groups of chewing lice, with over 300 described species (Price *et al.* 2003; Cicchino 2004; Cicchino & González-Acuña 2008, 2009; Mey & Barker 2014; Najer *et al.* 2012a,b,c, 2014; Rékási & Saxena 2005; Sychra *et al.* 2009, 2010a,b; Valim & Palma 2006, 2015; Valim & Weckstein 2011). *Brueelia sensu lato* (as in Price *et al.* 2003) is highly variable and the characters that circumscribe this genus are poorly defined. Mey & Barker (2014) provided a narrower and more explicit morphological circumscription of *Brueelia* and a list of genera they considered to be valid within the *Brueelia*-complex. However, they did not include a checklist that indicated which species they considered to belong to the specified genera. The list of synonyms they provided for *Brueelia sensu stricto* (Mey & Barker 2014, table 2) suggests their circumscription contains several morphologically distinct groups.

Within *Brueelia sensu* Mey & Barker (2014) there is a core group of approximately 145 species that are very similar to the type species, *Brueelia brachythorax* (Giebel, 1874); these are characterised by the lack of a dorsal preantennal suture, sparse abdominal chaetotaxy, female subgenital plate with a cross-piece following the vulval margin, tergite IX in females not fused with tergite IX+X, and characteristic male genitalia. We refer to this group as *Brueelia sensu stricto*, and here we describe four new species belonging to this group. These new species are further characterised by a sinuous distal thickening of the male mesosome and a unique pattern of abdominal chaetotaxy (see below) that are not seen in any previously described species of *Brueelia sensu stricto*. Together, these four species form a distinct morphological group. Three of the four species parasitize starlings (family Sturnidae), while the fourth is from a shrike (family Laniidae). All hosts and new louse species are from sub-Saharan Africa.

### Material and methods

Slide-mounted specimens examined during this study are permanently deposited either in the collection of the Natural History Museum, London (NHML) or in the Natural History Museum of Slovenia (PMSL), as indicated below.



**FIGURES 1–2.** *Brueelia clara* n. sp. ex *Lamprotornis australis*. **1**, male habitus, dorsal and ventral views. **2**, female habitus, dorsal and ventral views. Abbreviations: *aps* = accessory post-spiracular seta; *ps* = pleural seta; *psps* post-spiracular principal seta; *ss* = sutural seta; *sts* = sternal seta; *tps* = tergal posterior seta.

Terminology of head characters and setae follow Clay (1951), as modified by Mey (1994), and are illustrated in Fig. 17; names given to setae should not be taken as positive statements of homology. Abdominal chaetotaxy (Fig. 1) follows Cicchino & Castro (1996), using the following abbreviations: *aps* = accessory postspiracular setae; *psps* = principal post-spiracular setae; *ps* = paratergal setae; *ss* = sutural setae; *sts* = sternal setae; *tps* = tergal posterior setae. Terminology of setae situated on the distal area of the vulva is given in Fig. 13; these include: *vms* = vulval marginal setae; *vss* = vulval submarginal setae; *vos* = vulval oblique setae, with the most distal situated near the vulval margin, as indicated in Fig. 13.

All measurements are given in millimeters. Dimensions provided: TL = total length (along midline including hyaline margin); HL = head length (along midline including hyaline margin); HW = head width (at temples); PRW = prothoracic width; PTW = pterothoracic width; AW = abdominal width (at segment V); SW = width of connection between female subgenital plate and cross-piece (at narrowest point); BPW = basal plate width (at widest point); MEW = mesosomal width (at widest point); GW = gonopore width; MEL = mesosome length (at midline); PAL = paramere length.

Host taxonomy follows Clements *et al.* (2014).

## Taxonomy

### Order Phthiraptera

#### Suborder Ischnocera

#### Family Philopteridae Burmeister, 1838

### *Brueelia* Kéler, 1936

**Type species:** *Brueelia rossittensis* Kéler, 1936: 257 [= *Brueelia brachythorax* (Giebel, 1874): 134] ex *Bombycilla garrulus garrulus* (Linnaeus, 1758), by original designation.

#### *clara* species group

#### *Brueelia clara* new species

#### *Brueelia rigbyi* new species

#### *Brueelia tkachi* new species

#### *Brueelia coryliventer* new species

These four species share the following characters with *Brueelia brachythorax*: dorsal preantennal suture absent; marginal carina complete, but displaced posteriorly and dorsally at osculum; *as3* absent; *pns* absent; *mts2* short; both sexes without *tps* on tergites II–VII; *psps* absent on female tergites II–V; female subgenital plate with cross-piece; tergite XI in female not fused with IX+X; male mesosome with large lateral lobes and distal ornamentation (rugose area, fringes, papillation, etc.); parameres with blunt proximal ends that do not extend medianly to overlap with proximal mesosome.

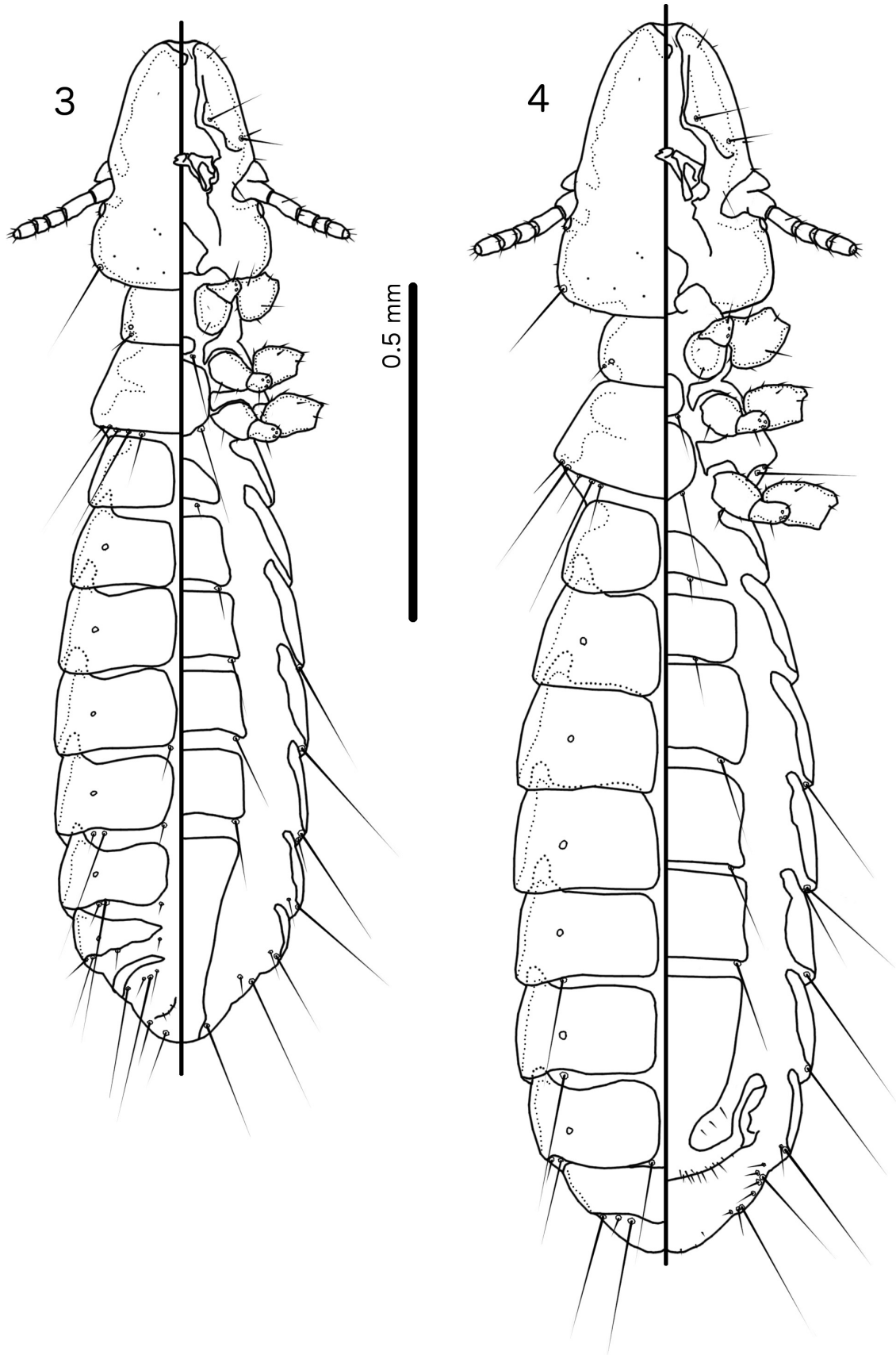
All four species described here have the following characters in common which differ from *B. brachythorax*: *pos* set on ocular lens; *ss* present on female tergite VIII; mesosome of the male genitalia with a sinuous distal thickening. This thickening has a lateral fold (*lf*) and a median fold (*mf*) (Fig. 9), with a densely rugose area in between. These unique characters unify these four species and warrant their treatment as a distinct species group within *Brueelia sensu stricto*.

### *Brueelia clara* Gustafsson & Bush, new species

(Figs 1–2, 9, 13, 17; Table 1)

**Type host:** *Lamprotornis australis* (A. Smith, 1836) (Sturnidae)—Burchell's glossy-starling.

**Type locality.** Namibia.



**FIGURES 3–4** *Brueelia rigbyi* n. sp. ex *Corvinella melanoleuca*. **3**, male habitus, dorsal and ventral views. **4**, female habitus, dorsal and ventral views.

**Diagnosis.** *Brueelia clara* is most similar to *B. rigbyi*, with which it shares the following characters: sternal and subgenital plates of both sexes with pale pigmentation; abdominal segment III of both sexes without *ps*; male parameres not constricted; male tergite V without *psps*; *lf* and *mf* of male mesosome reaching equally far distally. However, *B. clara* differs from *B. rigbyi* in the following characters: preantennal area with clearly convex lateral margins in *B. rigbyi* (Fig. 18) but straight in *B. clara* (Fig. 17); female abdominal segment IV–VII with 2 *ps* each on each side in *B. clara* (Fig. 2) but with 1 *ps* on each side in *B. rigbyi* (fig. 4); *mf* broad in *B. clara* (Fig. 9) but narrow in *B. rigbyi* (Fig. 10); anterior end of basal plate flatly rectangular in *B. rigbyi* but rounded in *B. clara*; vulval margin sharply convergent in *B. clara* (Fig. 13) but rounded in *B. rigbyi* (Fig. 14); connection between female subgenital plate and cross-piece slender in *B. clara* but broader in *B. rigbyi*.

**Description.** Head bluntly cone-shaped (Fig. 17). Frons flat to slightly rounded. Lateral margins of preantennal area straight, converging anteriorly. Marginal carina slender. Head chaetotaxy as in Fig. 17. Gular plate triangular, small. Flagellomeres I–II with darker pigmentation than the rest of antenna. Overall body pigmentation pale, moderate pigmentation restricted to pre- and postocular nodi, parts of marginal temporal carina, mandibles, posterior area of gular plate, proepimera, metepisterna, and pleurites. Measurements as in Table 1.

**Table 1. Range of measurements for species of the *clara* species group.**

Abbreviations: TL = total length; HL = head length; HW = head width; PRW = prothorax width; PTW = pterothorax width; AW = abdomen width; BPW = basal plate width; MEW = mesosome width; MEL = mesosome length; GW = gonopore width; PAL = paramere length; SW = width of connection between female subgenital plate and cross-piece.

Species	N	TL	HL	HW	PRW	PTW	AW	BPW	MEW	MEL	GW	PAL
<b>Males</b>												
<i>Brueelia clara</i>	9	1.52	0.36	0.26	0.17	0.25	0.26	0.15	0.12	0.06	0.01	0.10
		–1.63	–0.41	–0.28	–0.19	–0.29	–0.42	–0.17	–0.13	–0.07	–0.02	–0.13
<i>B. coryliventer</i>	2	1.34	0.33	0.25	0.17	0.23	0.33	0.15	0.10	0.05	0.01	0.11
		–1.48	–0.37	–0.27	–0.19	–0.26	–0.35					
<i>B. rigbyi</i>	2	1.39	0.34	0.25	0.18	0.25	0.34	0.15	0.11	0.06	0.01	0.10
		–1.49	–0.37	–0.27	–0.20	–0.28	–0.36	–0.16				
<i>B. tkachi</i>	1	1.42	0.34	0.26	0.17	0.25	0.37	0.17	0.12	0.05	0.02	0.11
<b>Females</b>												
<i>Brueelia clara</i>	9	1.82	0.43	0.30	0.20	0.29	0.42	0.09				
		–1.99	–0.46	–0.32	–0.22	–0.32	–0.48					
<i>B. coryliventer</i>	9	1.63	0.36	0.25	0.18	0.24	0.39	0.07				
		–1.77	–0.39	–0.27	–0.19	–0.27	–0.42	–0.10				
<i>B. rigbyi</i>	1	1.77	0.42	0.30	0.20	0.30	0.44	0.14				
<i>B. tkachi</i>	4	1.73	0.39	0.30	0.19	0.28	0.43	0.08				
		–1.83	–0.41	–0.31	–0.20	–0.29						

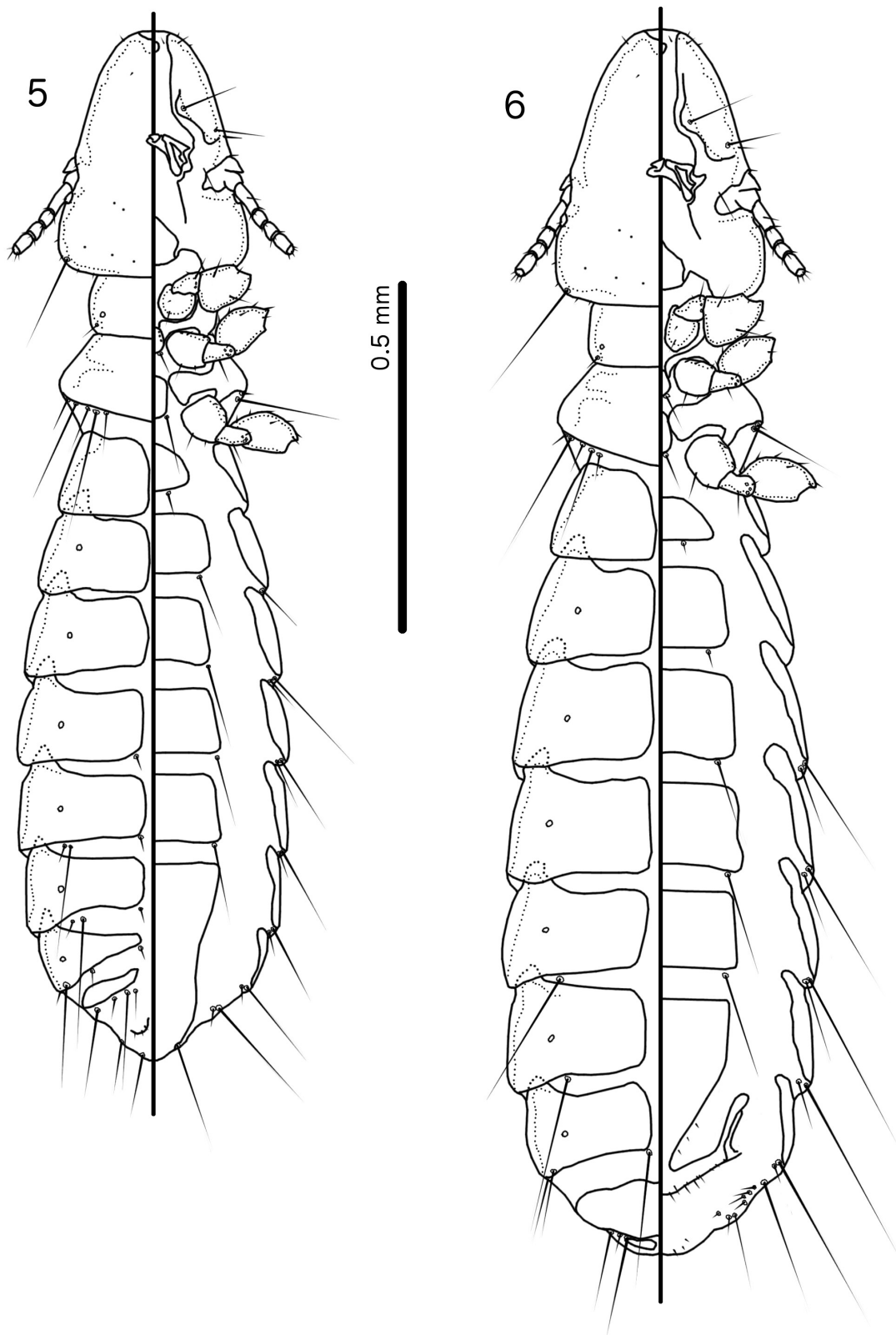
**Male.** Thorax and abdomen as in Fig. 1; *psps* absent on tergite V; segment III without *ps*; segment IV with 1 *ps*; segment XI with 3 setae. Male genitalia as in Fig. 9. Basal plate rounded anteriorly, slightly narrower in proximal end than in distal end. Distal margin of mesosome with strongly sinuous thickening; *lf* and *mf* with narrow folds reaching the same level distally. Parameres roughly triangular, lateral margins more or less straight.

**Female.** Thorax and abdomen as in Fig. 2; segments IV–VII with two *ps* each. Cross-piece of subgenital plate with narrow connection to main plate as in Fig. 13. Vulval margin converges to median point, with 4–6 slender *vms* on each side, and 3–5 thorn-like *vss* on each side; 3–5 slender *vos* on each side, 1 distal *vos* median to *vss* on each side.

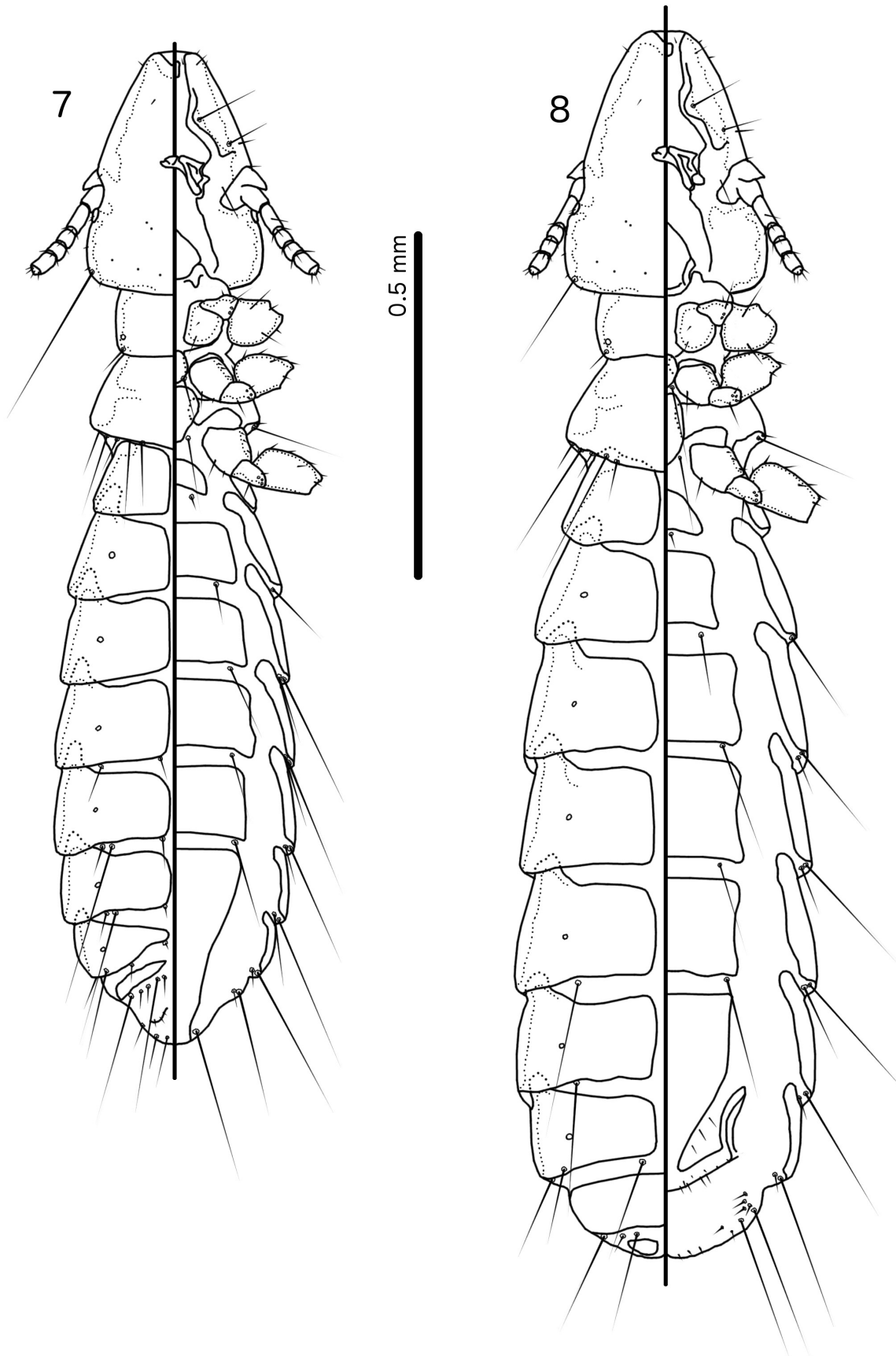
**Comments.** We examined material of *Brueelia* from other species of the same genus as the type host of *B. clara*, i.e. *Lamprotornis chalybaeus cyaniventris* (Blyth, 1855), *L. purpureus purpureus* (Stadius Müller, 1776), *L. purpureoptera purpureoptera* Rüppell, 1845, and *L. superbus* Rüppell, 1845. None of this material belongs to the *clara* species group.

**Material examined. Types:** Holotype ♂, Namibia (as “S.W. Africa”), May 1949, R. Meinertzhagen, 19253-4, marked with black dot on slide (NHML). Paratypes: 8♂, 9♀, same data as holotype (NHML).

**Etymology.** The species epithet is from Latin “*clarus*” = “clear”, referring to the almost entirely transparent abdomen of this species.



**FIGURES 5–6.** *Brueelia tkachi* n. sp. ex *Spreo albicapillus albicapillus*. 5, male habitus, dorsal and ventral views. 6, female habitus, dorsal and ventral views.



**FIGURES 7–8.** *Brueelia coryliventer* n. sp. ex *Creatophora cinerea*. 7, male habitus, dorsal and ventral views. 8, female habitus, dorsal and ventral views.

### ***Brueelia rigbyi* Gustafsson & Bush, new species**

(Figs 3–4, 10, 14, 18; Table 1)

**Type host:** *Corvinella melanoleuca* (Jardine, 1831) (Laniidae)—magpie shrike.

**Type locality.** Nierop, near Rustenburg, Transvaal, South Africa.

**Diagnosis.** *Brueelia rigbyi* is most similar to *B. clara*, with which it shares the following characters: sternal and subgenital plates of both sexes with pale pigmentation; *ps* absent on abdominal segment III in both sexes; male parameres without constriction; male tergite V without *psps*; *lf* and *mf* of male mesosome reaching equally far distally. However, *B. rigbyi* differs from *B. clara* in the following characters: preantennal area with clearly convex lateral margins in *B. rigbyi* (Fig. 18) but straight in *B. clara* (Fig. 17); female abdominal segment IV–VII with 1 *ps* each on each side in *B. rigbyi* (Fig. 4) but with 2 *ps* on each side in *B. clara* (fig. 2); *mf* narrow in *B. rigbyi* (Fig. 10) but broad in *B. clara* (Fig. 9); anterior end of basal plate flatly rectangular in *B. rigbyi* but rounded in *B. clara*; vulval margin rounded in *B. rigbyi* (Fig. 14) but sharply convergent in *B. clara* (Fig. 13); connection between female subgenital plate and cross-piece slender in *B. clara* but broader in *B. rigbyi*.

**Description.** Head narrowly dome-shaped (Fig. 18). Frons flat to slightly concave. Lateral margins of preantennal head convex, converging anteriorly, abruptly rounded. Marginal carina slender. Head chaetotaxy as in Fig. 18. Gular plate long, triangular. Overall body pigmentation pale, moderate pigmentation only on head carinae, mandibles, gular plate, pedicel, all 3 flagellomeres, proepimera, and metepisterna. Measurements as in Table 1.

**Male.** Thorax and abdomen as in Fig. 3; *psps* absent on tergite V; segments IV–V with 1 *ps*; segment XI with 3 setae. Male genitalia as in Fig. 10. Basal plate rectangular. Distal margin of mesosome with strongly sinuous thickening; *lf* and *mf* with narrow folds reaching the same level distally. Parameres triangular, lateral margins more or less straight.

**Female.** Thorax and abdomen as in Fig. 4; *ps* absent on segment III; segments IV, VI, and VII with one *ps* each; segment V in single examined female with two *ps* on one side and one *ps* on the other. Cross-piece of subgenital plate with broad connection to main plate as in Fig. 14. Vulval margin gently rounded (Fig. 14), with 6 slender *vms* on each side, and 5 thorn-like *vss* on each side; 5 slender *vos* on each side; 2 distal *vos* median to *vss* on each side.

**Comments.** *Brueelia rigbyi* is the only species of the group known from the Laniidae. We examined samples of *Brueelia* s. str. from the following Laniidae hosts: *Eurocephalus angutimiens niveus* Clancey, 1965, *E. rueppelli* Bonaparte, 1853, *Lanius collurio* Linnaeus, 1758, *L. excubitor excubitor* Linnaeus, 1758, *L. meridionalis aucheri* Bonaparte, 1853, *L. m. buryi* Lorenz von Liburnau & Hellmayr, 1901, *L. isabellinus* Hemprich & Ehrenberg, 1833, *L. ludovicianus* Linnaeus, 1766, *L. minor* Gmelin, 1788, *L. nubicus* Lichtenstein, 1823, and *L. vittatus* Valenciennes, 1826. None of this material belongs to the *clara* species group, but instead represent other species groups within *Brueelia sensu stricto*.

The type material listed below derives from two different, geographically separated localities, suggesting that *Corvinella melanoleuca* is the true host of *B. rigbyi*, and not the result of cross-contamination or naturally occurring straggling events.

**Material examined. Types:** Holotype ♂, Nierop, near Rustenburg, Transvaal, South Africa, Brit. Mus. 1958-424 (NHML). Paratypes: 1 ♀, same data as holotype (NHML). 1 ♂, Tsessebe, Botswana (as “Bechuanaland”), 28 Dec. 1955, Brit. Mus. 1956-561 (NHML).

**Etymology.** We name this species in honor of Mr Larry Rigby, co-founder of *Larada Sciences Inc.* (Salt Lake City, Utah, U.S.A.) in recognition of his contributions to the control of human head lice, as well as his strong interest in basic scientific research.

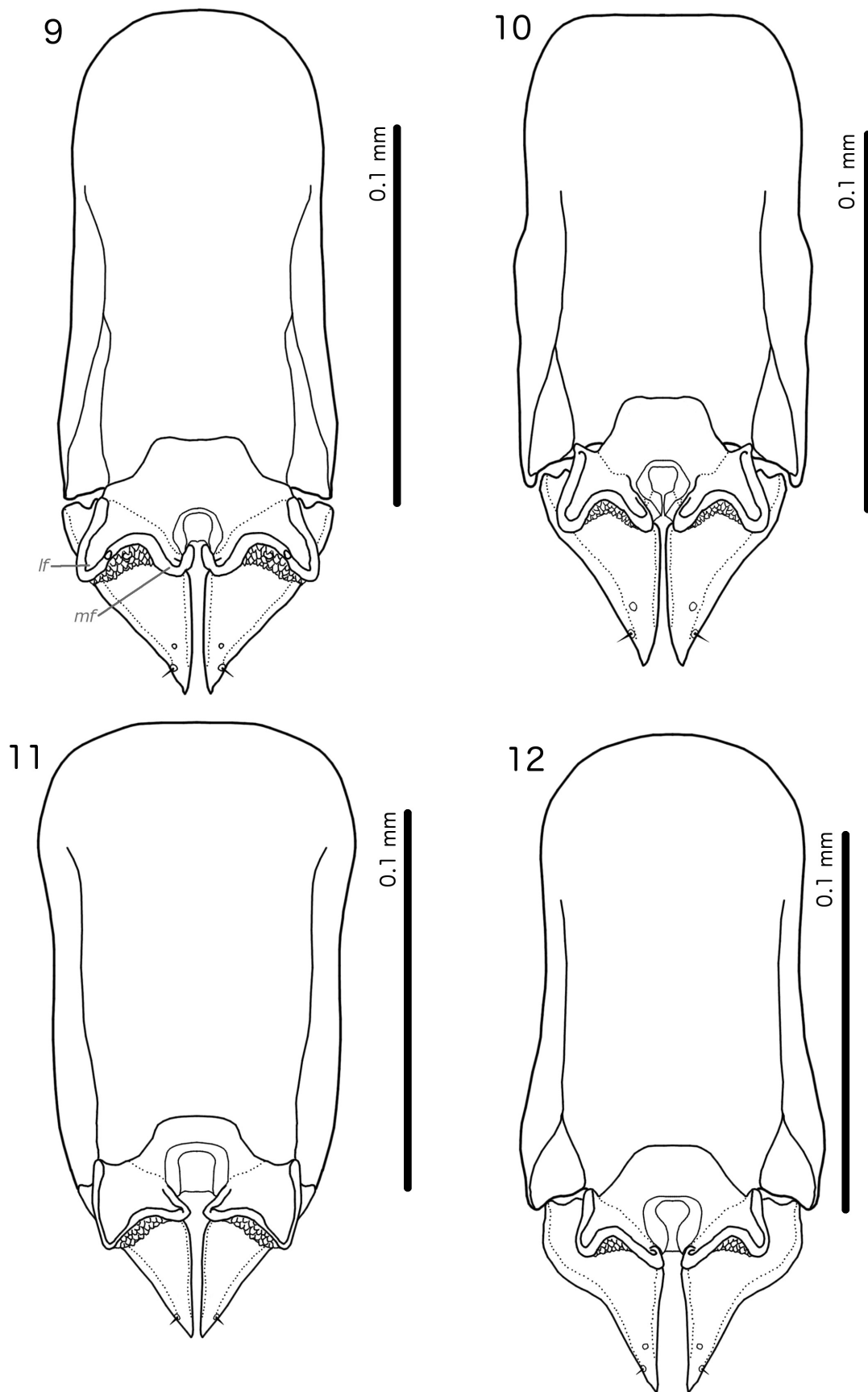
### ***Brueelia tkachi* Gustafsson & Bush, new species**

(Figs 5–6, 11, 15, 19; Table 1)

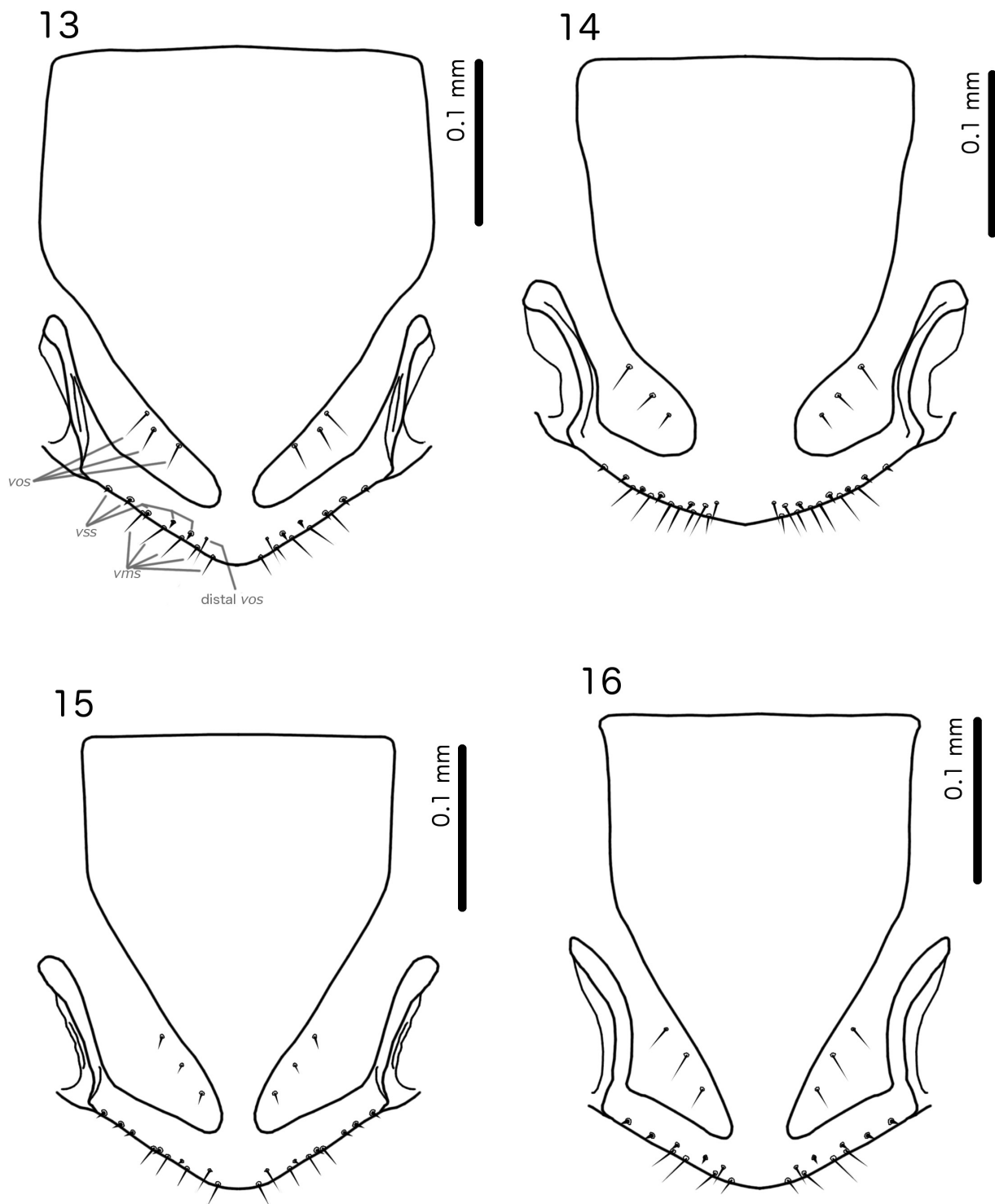
**Type host:** *Spreo albicapillus albicapillus* Blyth, 1856 (Sturnidae)—white-crowned starling.

**Type locality.** Somalia.





**FIGURES 9–12.** Male genitalia, dorsal views. **9**, *Brueelia clara* n. sp. **10**, *Brueelia rigbyi* n. sp. **11**, *Brueelia tkachi* n. sp. **12**, *Brueelia coryliventer* n. sp. Abbreviations: *lf* = lateral fold; *mf* = median fold.



**FIGURES 13–16.** Female subgenital plates and vulval margins, ventral views. **13**, *Brueelia clara* n. sp. **14**, *Brueelia rigbyi* n. sp. **15**, *Brueelia tkachi* n. sp. **16**, *Brueelia coryliventer* n. sp. Abbreviations: *vms* = vulval marginal setae; *vos* = vulval oblique setae; *vss* = vulval submarginal setae.

**Diagnosis.** *Brueelia tkachi* is most similar to *B. coryliventer*, with which it shares the following characters: sternal and subgenital plates with moderate pigmentation in both sexes; lateral margins of preantennal head clearly convex; male abdominal segment III with 1 *ps* on each side; male abdominal segment IV with 2 *ps* on each side; female abdominal segment IV with 2 *ps* on each side; female subgenital plate slenderly pentagonal. These two

species differ in the following characters: frons gently rounded in *B. tkachi* (Fig. 19) but flat and angular in *B. coryliventer* (Fig. 20); *psps* absent on male tergite V in *B. tkachi* (Fig. 5) but present in *B. coryliventer* (Fig. 7); *ps* absent on female abdominal segment III in *B. tkachi* (Fig. 6) but present in *B. coryliventer* (Fig. 8); basal plate of *B. tkachi* (Fig. 11) with broad, flattened anterior end, but with narrow, rounded anterior end in *B. coryliventer* (Fig. 12); male mesosome with *mf* extending farther posterior and being broadly triangular in *B. tkachi*, but shorter and with small, rounded *mf* in *B. coryliventer*; male parameres constricted in *B. coryliventer* but not constricted in *B. tkachi*.

**Description.** Head with frons gently rounded (Fig. 19). Lateral margins of preantennal area converging anteriorly, slightly convex, gently rounded. Marginal carina slender. Head chaetotaxy as in Fig. 19. Gular plate short, broad, triangular. Overall body pigmentation pale, with moderate pigmentation only on preocular nodi, flagellomeres, pedicel, proepimera, and metepisterna, sternal and subgenital plates of both sexes. Flagellomeres generally slightly darker than pedicel. Measurements as in Table 1.

**Male.** Thorax and abdomen as in Fig. 5; *ps* present on segment III; segment IV with 2 *ps*; *psps* absent on tergite V; segment XI with 3 setae. Male genitalia as in Fig. 11. Basal plate broad, rectangular, narrowing slightly distally. Distal thickening of mesosome weakly sinuous, with *lf* and *mf* angular rather than round; *lf* much larger than *mf*, and reaching farther distally than *mf*. Parameres relatively slender, lateral margin more or less straight. Anterior sensilla of parameres not visible in single examined male.

**Female.** Thorax and abdomen as in Fig. 6; *ps* absent on segment III; segments IV–VII with 2 *ps* each. Cross-piece of subgenital plate with very narrow connection to main plate as in Fig. 15. Vulval margin convergent to blunt median point (Fig. 15), with 4–5 slender *vms* on each side, and 4–5 thorn-like *vss* on each side; 4–5 slender *vos* on each side; 1 distal *vos* median to *vss* on each side.

**Comment.** We have not examined specimens of *Brueelia sensu stricto* from other host species of the genus *Spreo* Lesson, 1831.

**Material examined. Types:** Holotype ♂, Somalia (as “Somaliland”), Jan. 1949, R. Meinertzhagen, 18230 (NHML). Paratypes: 4♀, same data as holotype (NHML).

**Etymology.** We name this species in honor of Dr Vasyl Tkach (University of North Dakota, Grand Forks, North Dakota, U.S.A.) in recognition of his research in parasite systematics.

### ***Brueelia coryliventer* Gustafsson & Bush, new species**

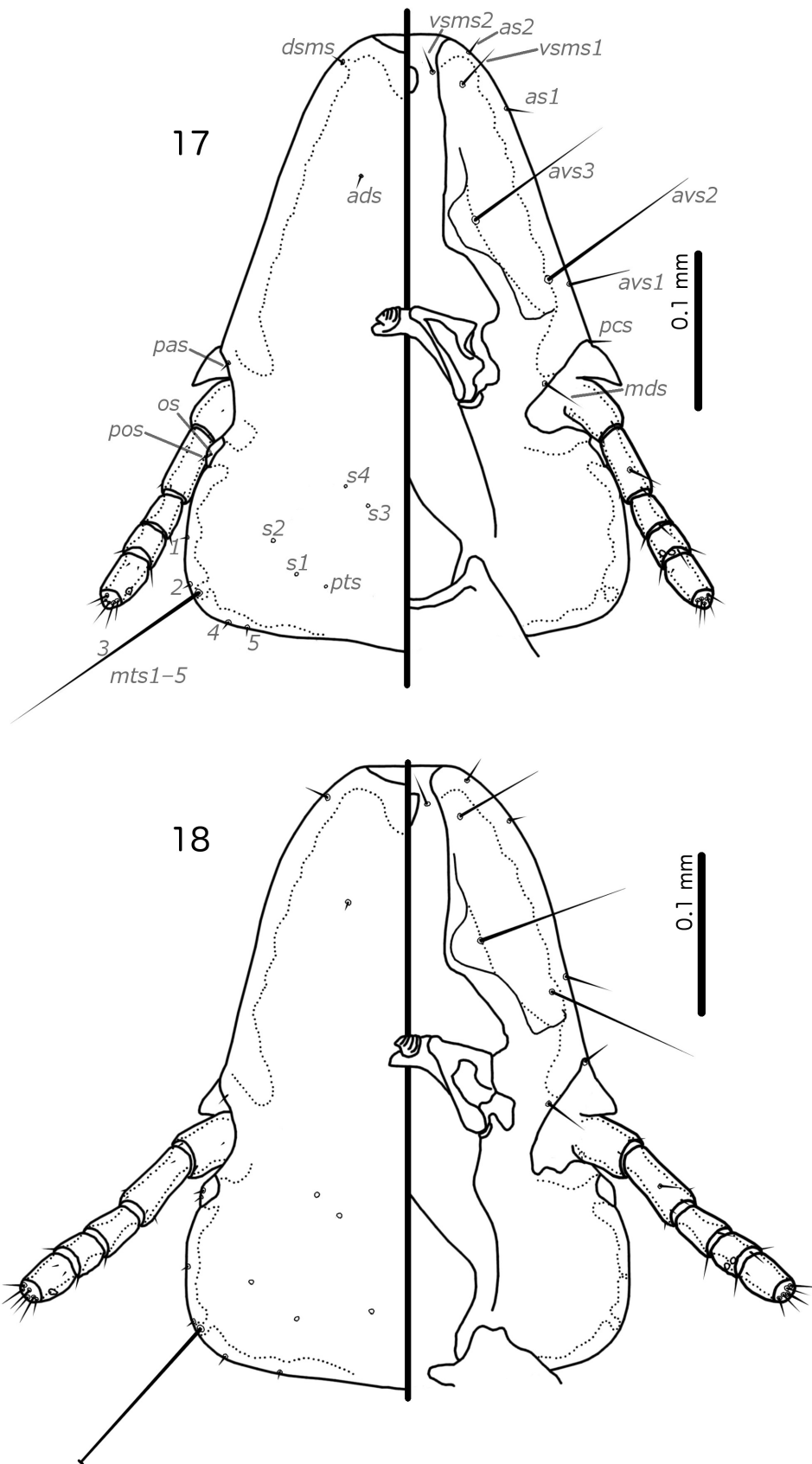
(Figs 7–8, 12, 16, 20; Table 1)

**Type host:** *Cretophora cinerea* (Meuschen, 1787) (Sturnidae)—wattled starling.

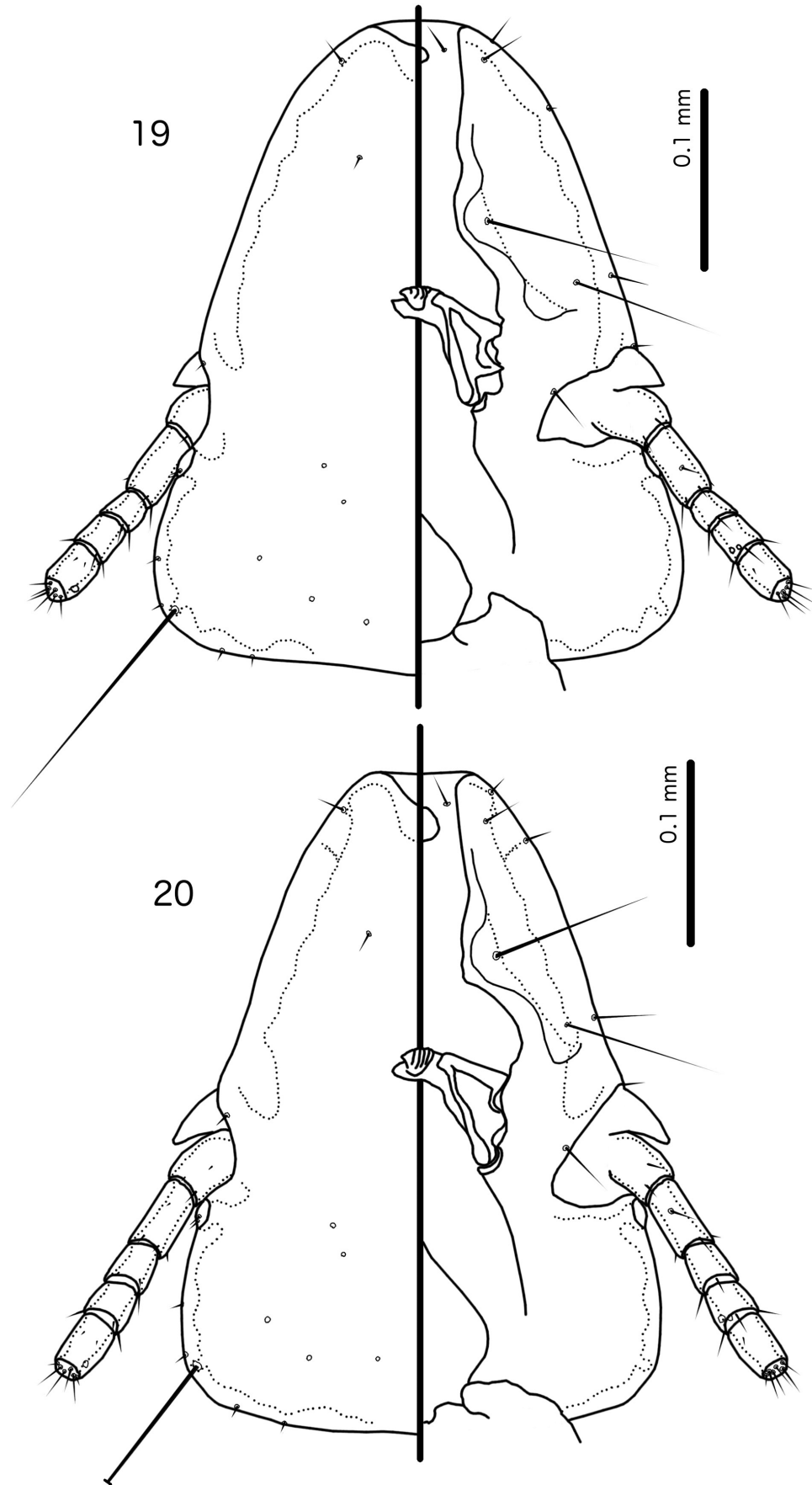
**Type locality.** Isiolo, Kenya.

**Diagnosis.** *Brueelia coryliventer* is most similar to *B. tkachi*, with which it shares the following characters: both sexes with moderate pigmentation on sternal and subgenital plates; lateral margins of preantennal head clearly convex; 1 *ps* present on male abdominal segment III on each side; 2 *ps* present on male abdominal segment IV on each side; 2 *ps* on female abdominal segment IV on each side; female subgenital plate slenderly pentagonal. These two species differ in the following characters: frons flat and angular in *B. coryliventer* (Fig. 20) but gently rounded in *B. tkachi* (Fig. 19); *psps* present in *B. coryliventer* (Fig. 7) but absent on male tergite V in *B. tkachi* (Fig. 5); *ps* present on female abdominal segment III in *B. coryliventer* (Fig. 8) but absent in *B. tkachi* (Fig. 6); basal plate with narrow, rounded anterior end in *B. coryliventer* (Fig. 12) but with broad, flattened anterior end in *B. tkachi* (Fig. 11); male mesosome with *mf* extending farther posterior and being broadly triangular in *B. tkachi*, but shorter and with small, rounded *mf* in *B. coryliventer*; male parameres constricted in *B. coryliventer* but not constricted in *B. tkachi*.

**Description.** Head cone-shaped (Fig. 20). Frons flat. Lateral margins of preantennal head converging anteriorly, slightly convex, abruptly rounded anteriorly. Marginal carina broad. Head chaetotaxy as in Fig. 20. Gular plate long, broad, triangular. Overall body pigmentation light, with moderate pigmentation on head carinae and nodi, mandibles, anterior margin of scape, pedicel, flagellomeres I–III, proepimera, metepisterna, and subgenital plates and sternal plates IV–VI of both sexes. Pigmentation of sternal plates lighter in female. Measurements as in Table 1.



**FIGURES 17–18.** Male heads, dorsal and ventral views. **17**, *Brueelia clara* n. sp. **18**, *Brueelia rigbyi* n. sp. Abbreviations: *ads* = anterior dorsal seta; *as1–2* = anterior setae 1–2; *avs1–3* = anterior ventral setae 1–3; *dsms* = dorsal submarginal seta; *mds* = mandibular seta; *mts1–5* = marginal temporal setae 1–5; *os* = ocular seta; *pcs* = preconal seta; *pas* = preantennal seta; *pos* = preocular seta; *pts* = post-temporal seta; *s1–4* sensilla 1–4; *vsms1–2* = ventral submarginal setae 1–2.



**FIGURES 19–20.** Male heads, dorsal and ventral views. 19, *Brueelia tkachi* n. sp. 20, *Brueelia coryliventer* n. sp.

**Male.** Thorax and abdomen as in Fig. 7; segment III with 1 *ps*; segment IV with 2 *ps*; *psps* present on tergite V; segment XI with 4 setae. Male genitalia as in Fig. 12. Basal plate roughly rectangular, anterior margin rounded. Mesosome with strongly sinuous distal thickening; both *lf* and *mf* smaller in relation to parameres, and *mf* reaching slightly more distally than *lf*. Parameres constricted midway along lateral margin.

**Female.** Thorax and abdomen as in Fig. 8. *ps* present on segment III. Segments IV–VII each with 2 *ps*. Cross-piece of subgenital plate with narrow connection to main plate as in Fig. 16. Vulval margin gently rounded (Fig. 16), with 4–5 slender *vms* on each side, and 4 thorn-like *vss* on each side; 4 slender *vos* on each side; 1 distal *vos* median to *vss* on each side.

**Comments.** *Creatophora* Lesson, 1847, is a monotypic genus. Unlike *Lamprotornis* Temminck, 1820 and *Spreo*, *Creatophora* is not part of the “African” starling radiation, but belongs to the “Eurasian” radiation (Lovette & Rubenstein 2007). We examined louse material from the following starlings and mynahs belonging to the Eurasian radiation: *Acridotheres fuscus fuscus* (Wagler, 1827), *A. fuscus torquatus* Davison, 1892, *A. ginginianus* (Latham, 1790), *A. grandis* Moore, 1858, *A. tristis tristis* (Linnaeus, 1766), *Gracupica contra contra* (Paykull, 1807), *G. nigricollis* (Linnaeus, 1758), *Pastor roseus* (Linnaeus, 1758), *Sturnia malabarica nemoricola* Jerdon 1862, *S. sinensis* (Gmelin, 1788), *Sturnus vulgaris* Linnaeus, 1758, and *Temenuchus pagodarum* (Gmelin, 1789). None of these samples belong to the *clara* species group of the genus *Brueelia*.

**Material examined. Types:** Holotype ♂, Isiolo, Kenya, Jan. 1956, R. Meinertzhagen, 20469 (NHML). Paratypes: 1 ♀, same data as holotype (NHML); 1 ♂, 8 ♀, Awassa, Ethiopia, 17 Nov. 1960, S. Brelieh, IM-3137–3145 (PMSL).

**Etymology.** The species epithet derives from Latin “*corylus*” = “hazel”, and “*ventrum*” = “ventral”, referring to the hazel-brown sternites of the holotype male.

### Key for the identification of species of the *Brueelia clara* species group

1. Frons of both sexes gently rounded (Fig. 19). Mesosome with weakly sinuous distal thickening (Fig. 11) . . . . . *Brueelia tkachi*
- Frons of both sexes flat to slightly concave (Fig. 20). Mesosome with strongly sinuous distal thickening (Fig. 10) . . . . . 2
2. Sternal and subgenital plates of both sexes with moderate pigmentation; male with *psps* on tergite V and *ps* on segment III (Fig. 7); parameres constricted at about half length (Fig. 12); female subgenital plate as in Fig. 16 . . . . . *Brueelia coryliventer*
- Sternal and subgenital plates of both sexes with pale pigmentation; male without *psps* on tergite V or *ps* on segment III (Figs 1, 3); parameres not constricted (Fig. 10); female subgenital plate as in Figs 13 or 14 . . . . . 3
3. Lateral margins of preantennal head straight (Fig. 17); male genitalia with anterior basal plate flat (Fig. 10); *mf* slender (Fig. 10); cross-piece with narrow connection (at most 0.09 mm) to female subgenital plate (Fig. 13) . . . . . *Brueelia clara*
- Lateral margins of preantennal head convex (Fig. 18); male genitalia with anterior basal plate rounded (Fig. 9); *mf* broad (Fig. 9); cross-piece with broad connection (more than 0.13 mm) to female subgenital plate (Fig. 14) . . . . . *Brueelia rigbyi*

### Discussion

The *clara* species group appears to be uniquely African. Three of its four species are from hosts belonging to avian genera endemic to Africa: *Corvinella* Lesson, 1831, *Lamprotornis* and *Spreo*. The host of the fourth species is *Creatophora cinerea*, a bird most commonly found in sub-Saharan Africa and, occasionally, in the Arabian Peninsula (Feare & Craig 1998). *Lamprotornis* and *Spreo* are part of the “African” radiation of starlings, whereas *Creatophora* is part of the “Eurasian” starling radiation (Lovette & Rubenstein 2007). The *clara* species group is recorded from two distantly related host families (Laniidae and Sturnidae) that diverged in the early Cenozoic (Cracraft & Baker 2009).

We examined specimens of *Brueelia* from a large range of potential hosts in both radiations, including other species of *Lamprotornis* (see under *B. clara*, above), several species of starlings and mynahs (see under *B. coryliventer*, above), as well as the following “African” and “red-winged” radiation starlings (*sensu* Lovette & Rubenstein 2007): *Neocichla gutturalis angusta* Friedmann, 1930, *Onychognathus blythii* (Hartlaub, 1859), *O. morio morio* (Linnaeus, 1766), *O. tenuirostris theresae* Meinertzhagen, 1937, and *O. tristramii* (Sclater, 1858). We also studied material of *Brueelia sensu stricto* from nine Eurasian starling species (see under *B. coryliventer*, above) and from nearly 200 non-starling host species from across the world. However, no other representative of the *Brueelia clara* species group was identified among the examined material.

The host distribution of the *clara* species group spans three genera of starlings from two major radiations, as well as one genus of shrike, suggesting that this group may be widely distributed among other African birds. However, the geographical distributions of lice does not always mirror that of their hosts. Lice found on multiple hosts can have a broader distribution than that of any one of their hosts, and lice may be restricted to a geographical region geographically that is smaller than that of their hosts (e.g. Clay 1972; Weckstein 2004; Toon & Hughes 2008). It is puzzling that we found such little material of the *clara* species group among specimens from African passerines. One possible explanation is that potential hosts are under-sampled, or that the members of this louse group are rare.

The *Brueelia* faunas of Europe, North and South America, and India are comparatively well studied, but little material of this genus has ever been described from sub-Saharan Africa, with only 36 species of *Brueelia* listed by Ledger (1980) from that region. Since then, only 5 species of *Brueelia* have been described from the region (Sychra *et al* 2010a,b; Najer *et al* 2012). Among these 41 species, only 12 are from hosts that breed in sub-Saharan Africa. Considering that over 1100 species of birds belonging to orders that are known to be parasitized by *Brueelia* species (Passeriformes, Piciformes, Coraciiformes) breed in that vast region (C.H. Sekercioglu, pers. comm. 2015), the louse fauna is severely under-sampled, especially from speciose host groups such as passerines, which contain many local endemics.

## Acknowledgements

Work supported by grant 36/07 1.4 from the Swedish Taxonomic Initiative and grant NSF-DEB-1050706. We thank Paul Brown (NHML) who prepared the loan of an extensive collection of *Brueelia* slides for this project. We thank Dr Michel P. Valim (Museu de Zoologia, Universidade de São Paulo, Ipiranga, São Paulo, Brazil) for helpful comments during the review of this manuscript.

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