Zootaxa 3027: 29–38 (2011)
www.mapress.com/zootaxa/

Article

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

Quill mites (Acari: Syringophilidae) from mimid birds (Aves: Mimidae)

BOZENA SIKORA, MONIKA FAJFER & MACIEJ SKORACKI
Department of Animal Morphology, Adam Mickiewicz University, Faculty of Biology, Umultowska 89, 61–614 Poznan, Poland. E–mail: skoracki@amu.edu.pl

Abstract

Two new species of syringophilid mites parasitizing birds from the family Mimidae are described: *Syringophilopsis mimidus* **sp. nov.** ex *Margarops fuscatus* (Vieillot) from Central America and *Rafapicobia toxostoma* **sp. nov.** ex *Toxostoma curvirostre* (Swainson) from USA. Additionally, *Torotrogla mima* Kethley, 1970 is redescribed based on the material ex *Mimus triurus* (Vieillot) from Argentina and *M. patagonicus* (Lafresnaye and Orbigny) from South Africa.

Key words: Acari, Syringophilidae, quill mites, ectoparasites, birds, Mimidae

Introduction

Syringophilid mites (Acari: Cheyletoidea: Syringophilidae) are permanent and obligatory avian ectoparasites. The entire life cycle of these mites occurs exclusively inside different types of quill feathers. They inhabit the flight and body feathers where they feed on soft tissue fluids of their hosts by piercing the calamus wall with their long and flexible chelicerae (Kethley 1971; Casto 1974). The world biodiversity of this group of parasites includes more than 240 species of 52 genera described from all zoogeographical regions (Skoracki 2011). Although they are widely distributed on their hosts and are known from representatives of 18 bird orders and 56 families (Skoracki & OConnor 2010; Skoracki 2011), our knowledge of the syringophilid fauna is still fragmentary.

The small passeriform family Mimidae comprises 34 species grouped in 11 genera. The distribution of the members of this family is restricted to the New World (South Nearctic and Neotropic regions) (del Hoyo *et al*. 2005). Unfortunately, until now only one species of syringophilid mite was described from this host family, *Torotrogla mima* found on *Mimus polyglottos* (Linnaeus) in the United States.

Below, we describe two new species, *Syringophilopsis mimidus* **sp. nov.** to be found on *Margarops fuscatus* (Vieillot) and *Rafapicobia toxostoma* **sp. nov.** collected from *Toxostoma curvirostre* (Swainson). Additionally, redescription of *Torotrogla mima* Kethley, 1970 based on the material from two host species of the genus *Mimus*, *M. triurus* (Vieillot) and *M. patagonicus* (Lafresnaye and Orbigny) is given.

Material and methods

The material used in the present study was collected in the ornithological collection of the Bavarian State Collection of Zoology, Munich, Germany (ZSM) from dry bird skins and preserved in 70% ethanol. Before mounting, mites were softened and cleared in 10% lactic acid at +60°C for 3 days. For light microscope study, mites were mounted on slides in Faure medium and investigated under the light microscope Olympus BH-2 with differential interference contrast (DIC) illumination. Drawings were made using a camera lucida drawing attachment. All measurements are given in micrometres. Dimension ranges of paratypes are given in brackets following holotype data.

The idiosomal setation follows Grandjean (1939) as adapted for Prostigmata by Kethley (1990). The system of nomenclature for leg chaetotaxy follows that proposed by Grandjean (1944). The application of these chaetotaxic schemes to Syringophilidae was recently provided by Bochkov *et al*. (2008). Morphological terminology follows

Accepted by A. Bochkov: 18 Aug. 2011; published: 15 Sep. 2011

Skoracki (2011). The scientific names of the birds follow Clements (2007). Specimen depositories and reference numbers are cited using the following abbreviations: AMU – A. Mickiewicz University, Department of Animal Morphology, Poznan, Poland, ZSM – Bavarian State Collection of Zoology, Munich, Germany, ZISP – Zoological Institute of the Russian Academy of Sciences, St. Petersburg, Russia.

Results

Family Syringophilidae Lavoipierre

Subfamily Syringophilinae Lavoipierre

Genus *Syringophilopsis* Kethley

Syringophilopsis mimidus sp. nov.

(Figs. 1–6)

Description. FEMALE (holotype). Total body length 1070 (1015–1145 in 6 paratypes). *Gnathosoma*. Infracapitulum apunctate. Hypostomal apex with 1 pair of short protuberances. Each medial branch of peritremes with 4–5 chambers, each lateral branch with 17–18 chambers. Length of apunctate stylophore and movable cheliceral digit 240 (240–245) and 170 (170–180) respectively. *Idiosoma*. Propodonotal shield with deeply concave anterior margin, sculptured at lateral margins, bearing bases of setae *vi*, *ve*, *si*, *c1* and *se*. Length ratio of setae *vi:ve:si* 1:2.2:2.9. Setae *se* and *c1* situated at same transverse level. Setae *si* situated slightly anterior to level of setae *c2*. Hysteronotal shields clearly visible. Pygidial shield well sclerotized, triangular in shape. All terminal setae long, longer than 300. Genital setae *g1* slightly (1.1–1.2 times) longer than *g2*, both shorter than aggenital setae *ag1–ag3*. Length ratio of setae *g1:ag2* 1:2.5–3.5. Setae *ag1* not significantly (1.1 times) longer than *ag2*. Coxal fields I–IV apunctate. Setae *3c* slightly (1.3 times) longer than *3b*. *Legs*. Fan-like setae *p'* and *p"* of legs III and IV with 16–17 tines. Setae *tc"* of legs III and IV 1.5 times as long as *tc'III–IV.* Apodemes I fused in anterior part of apodemes II. *Lengths of setae: vi* 120 (105–120), *ve* 230 (200–260), *si* (345), *se* (305), *c1* 395 (320–350), *d1* (375), *d2* 350 (370–395), *e2* (380), *f1* 400 (420), *f2* <350, *h1* (320–325), *h2* (460), *ps1* 40 (40–50), *ps2* (30–40), *g1* 90 (80–90), *g2* 80 (65–75), *ag1* (240), *ag2* (160–210), *ag3* (285), *tc'III–IV* 60 (60–70), *tc"III–IV* (90–100), *3b* 100, *3c* 110, *l'RIII* 70 (65–70), *l'RIV* 65 (65), *dTIII* 135.

MALE (3 paratypes). Total body length 700–745. *Gnathosoma*. Infracapitulum apunctate. Length of apunctate stylophore and movable cheliceral digit 190–200 and 160 respectively. *Idiosoma*. Surface of propodonotal shield covered by minute punctations, bearing bases of setae *vi*, *ve*, *si*, *se*, and *c1*. Length ratio of setae *vi:ve:si* 1:2.2–2.3:3.7–4. Setae *se* situated slightly anterior to level of setae *c1*. Setae *si* situated distinctly anterior to level of setae *c2*. Hysteronotal shield fused to pygidial shield, deeply concave on anterior margin, bearing bases of setae *d1*, *f2* and *h2*, setae *e2* located on or near this shield. Setae *d2* 2.8 times longer than *e2*. Setae *h2* 8 times longer than *f2*. Coxal fields I–IV apunctate. Setae *3c* 1.7 times longer than *3b*. *Legs*. Setae *tc"* of legs III and IV 1.6 times longer than *tc'III–IV. Lengths of setae: vi* 55–65, *ve* 125–140, *si* 220–240, *se* 220–235, *c1* 200, *d1* 25, *d2* 70, *e2* 20–25, *f2* 25, *h2* 200, *ag1* 80–100, *ag2* 40–60, *ag3* 65, *tc'III–IV* 40, *tc"III–IV* 65, *3b* 60, *3c* 100, *lR'III* 70, *l'RIV* 60.

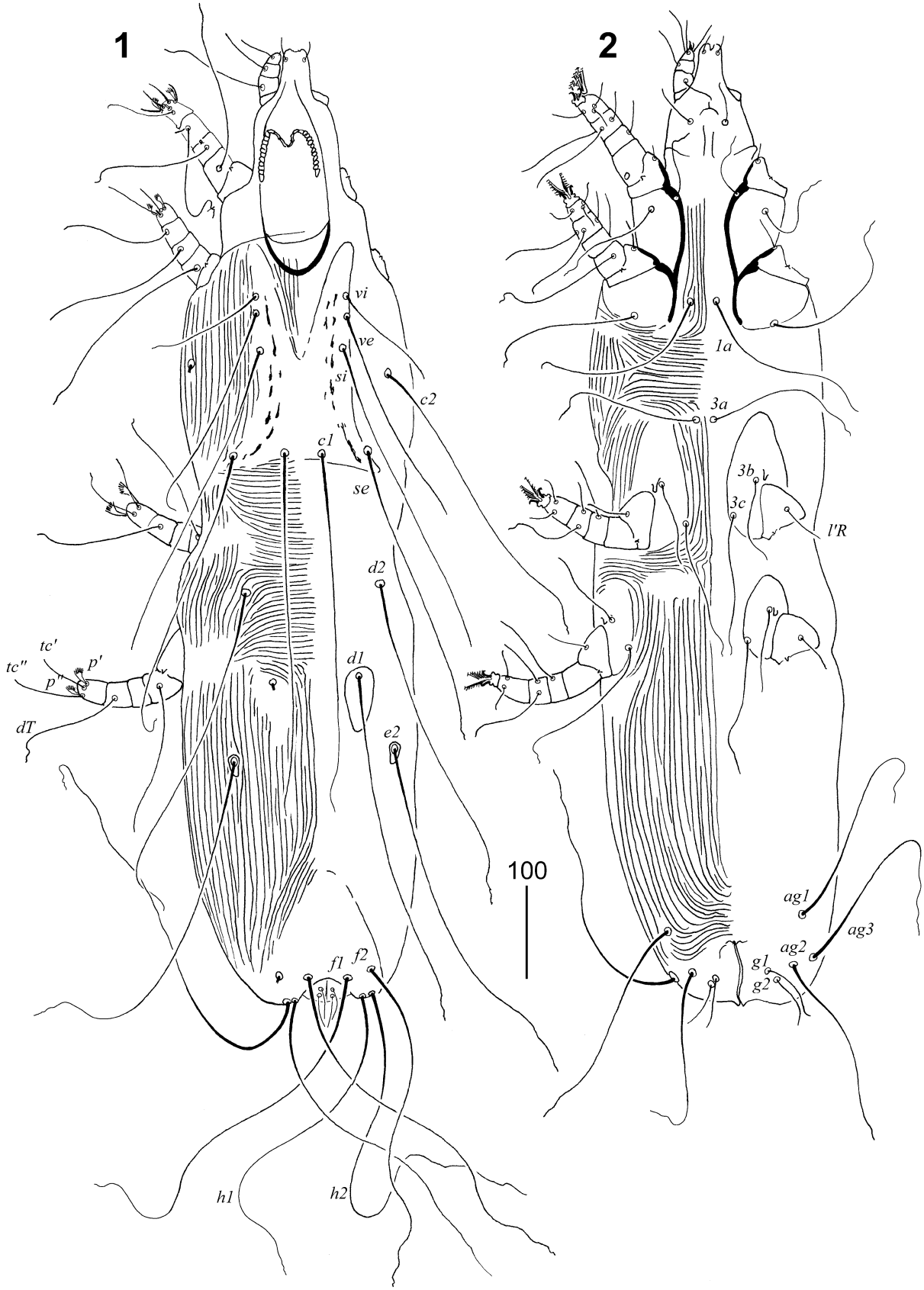
Type material. Female holotype and paratypes: 9 females, 3 males, 6 nymphs and 1 larva (AMU–SYR.331) from *Margarops fuscatus* (Vieillot); **CENTRAL AMERICA**, 19 March 1895, coll. C. Dalmas. Mites removed by M. Skoracki.

Type deposition. All material is deposited in the AMU, except 1 female in the ZSM and 2 females in the ZISP.

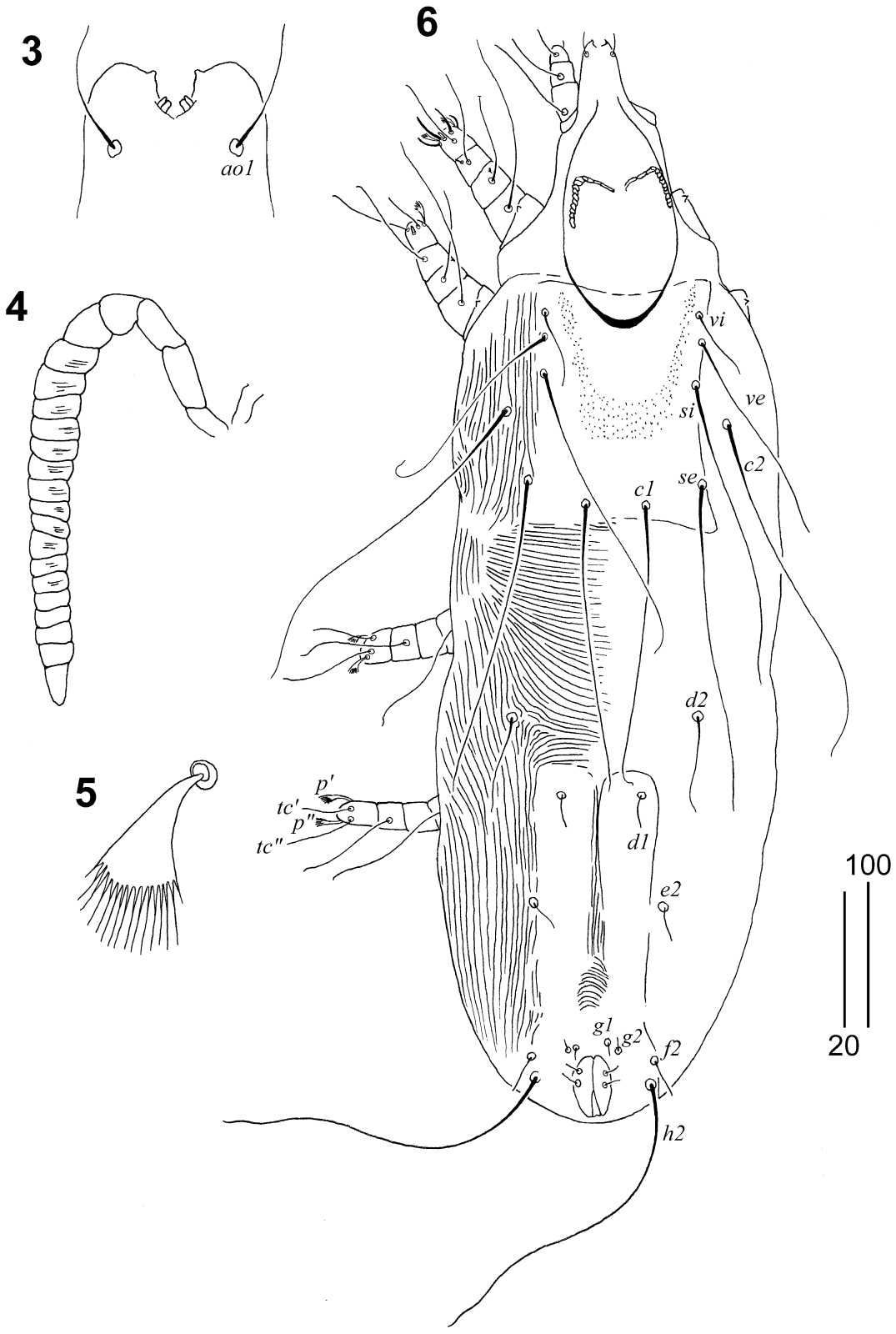
Etymology. The name *mimidus* refers to the family name of the host – Mimidae.

Differential diagnosis. This new species is morphologically similar to *S. nitens* Skoracki and Dabert, 2001 described from *Malimbus nitens* (Gray) (Ploceidae) from Togo (Skoracki & Dabert 2001). In females of both species, all terminal setae are long, genital setae are distinctly shorter than aggenital setae; setae *si* are situated slightly anterior to the level of setae *c2*, the hysteronotal shield is distinctly visible and the hypostomal apex is ornamented by one pair of protuberances. This new species differs from *S. nitens* by the following characters: in females of *S. mimidus* **sp. nov.**, each branch of the peritremes has 21–22 chambers; the length of setae *g1* is 80–90; fan-like setae *p'* and *p"* of legs III and IV are with 16–17 tines; in males setae *d2* are 2.8 times longer than *e2*. In females of *S.*

nitens, each branch of the peritremes has 15–17 chambers; length of setae *g1* is 55; fan-like setae *p'* and *p"* of legs III and IV are with 6–9 tines; in males setae *d2* and *e2* are subequal in the length.



FIGURES 1, 2. *Syringophilopsis mimidus* **sp. nov.**, female. **1**, dorsal view; **2**, ventral view.



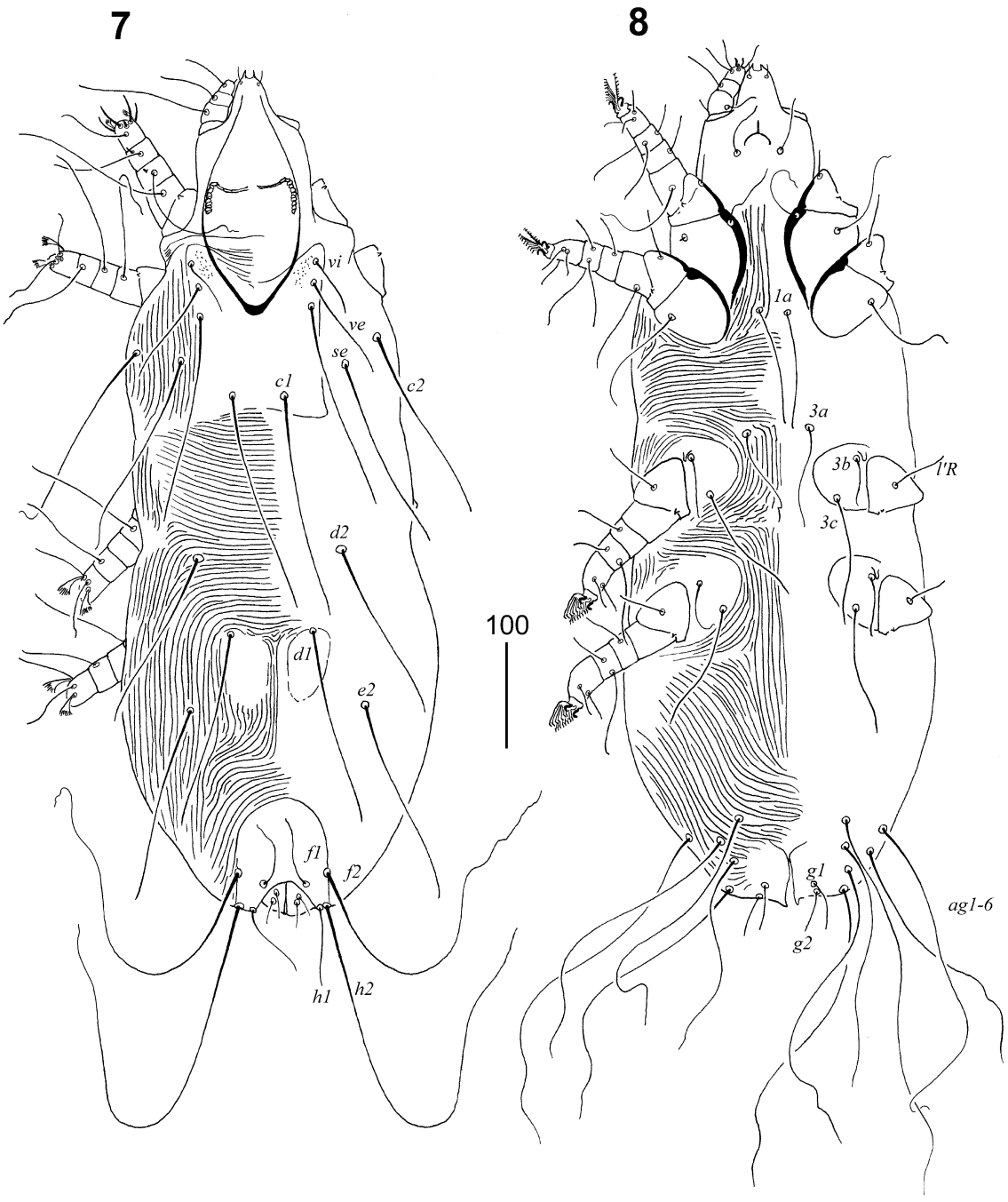
FIGURES 3–6. *Syringophilopsis mimidus* **sp. nov.**, female (**3–5**). **3**, hypostomal apex; **4**, peritreme; **5**, fan-like setae *p'* of legs III. Male (**6**). **6**, dorsal view.

Genus *Torotrogla* Kethley

Torotrogla mima Kethley, 1970

(Figs. 7–11)

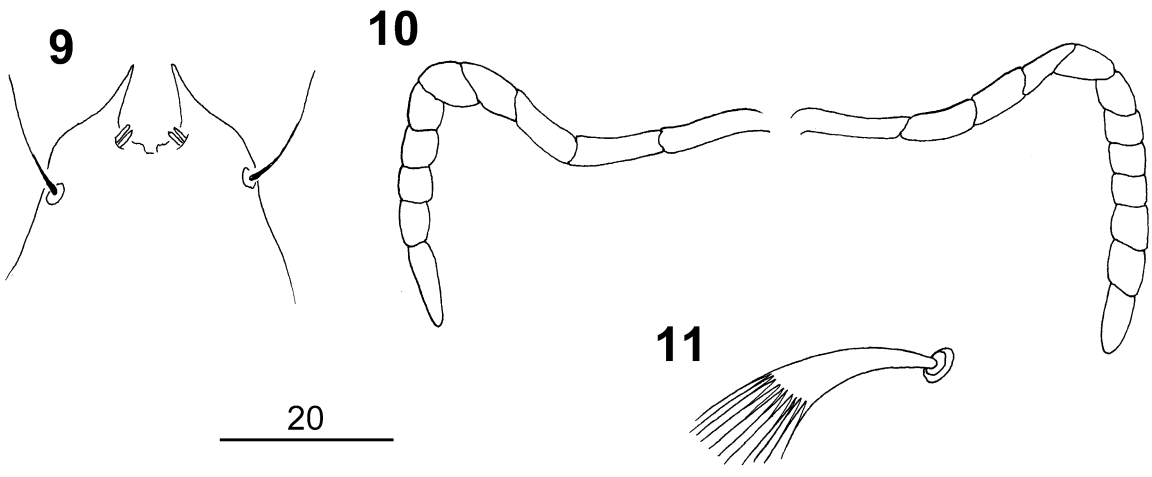
Torotrogla mima Kethley, 1970: 31, figs. 16 and 17.
Type host: *Mimus polyglottos* (Linnaeus) (Mimidae); Type locality: N. W. Odum, Wayne County, Georgia, United States.



FIGURES 7, 8. *Torotrogla mima* Kethley, 1970, female. **7**, dorsal view; **8**, ventral view.

Redescription. FEMALE (10 specimens from additional host – *Mimus triurus* from Argentina). Total body length 750–810. *Gnathosoma*. Hypostomal apex with pair of medium-sized, sharp-ended and bill-like protuberances. Length of movable cheliceral digit 160–165. Infracapitulum apunctate. Each medial branch of peritremes with 5

chambers, each lateral branch with 5–7 chambers. Stylophore constricted posteriorly, apunctate, 230–235 long. *Idiosoma*. Propodonotal shield rectangular in shape, concave on anterior and posterior margins, apunctate, bearing bases of setae *vi*, *ve*, *si* and *c1*. Length ratio of setae *vi:ve:si* 1:1.5–1.8:3.5–4. Setae *c2* situated anterior to level of setae *se*, setae *se* situated anterior to level of setae *c1*. Two hysteronotal shield clearly visible and apunctate with bases of setae *d1* located on anterior margins. Pygidial shield rounded on anterior margin, apunctate. Setae *f1* and *h1* subequal in length. Coxal fields I–IV apunctate. Setae *3c* twice as long as *3b*. Both genital setae (*g1* and *g2*) subequal in length. Both pseudanal setae (*ps1* and *ps2*) subequal in length. Aggenital setal series represented by 5–6 pairs. *Legs*. Fan-like setae *p'* and *p"* of legs III and IV with 10–11 tines. Setae *tc'* and *tc"* of legs III and IV subequal in length. *Lengths of setae: vi* 50–55, *ve* 80–105, *si* 190–205, *se* 180–195, *c1* 200–220, *d1*180–200, *d2* 165–175, *e2* 190–200, *f1* 55–65, *f2* 365–450, *h1* 70–75, *h2* 390–460, *ps1* 25–30, *ps2* 30, *g1* 45–55, *g2* 45, *tc'III–IV* 55–65, *tc"III–IV* 50–65, *3b* 50–65, *3c* 110–115, *l'RIII* 55–60, *l'RIV* 50.



FIGURES 9–11. *Torotrogla mima* Kethley, 1970, female. **9**, hypostomal apex; **10**, peritremes; **11**, fan-like setae *p'* of legs III.

Material examined. 15 females and 6 nymphs (AMU–SYR.332) from *Mimus triurus* (Vieillot); **ARGENTINA**, Santa Fe, Las Rosas, July–August 1925, coll. M. Kieffer. Mites removed by M. Skoracki. All material is deposited in the AMU, except 2 females in the ZSM and 2 females in the ZISP. 2 females and 2 larvae (AMU–SYR.333) from *Mimus patagonicus* (Lafresnaye and Orbigny); **SOUTH AMERICA**, Patagonia, 16 October 1907, coll. A. Lendl. Mites removed by M. Skoracki. All material is deposited in the AMU.

Subfamily Picobiinae Johnston and Kethley

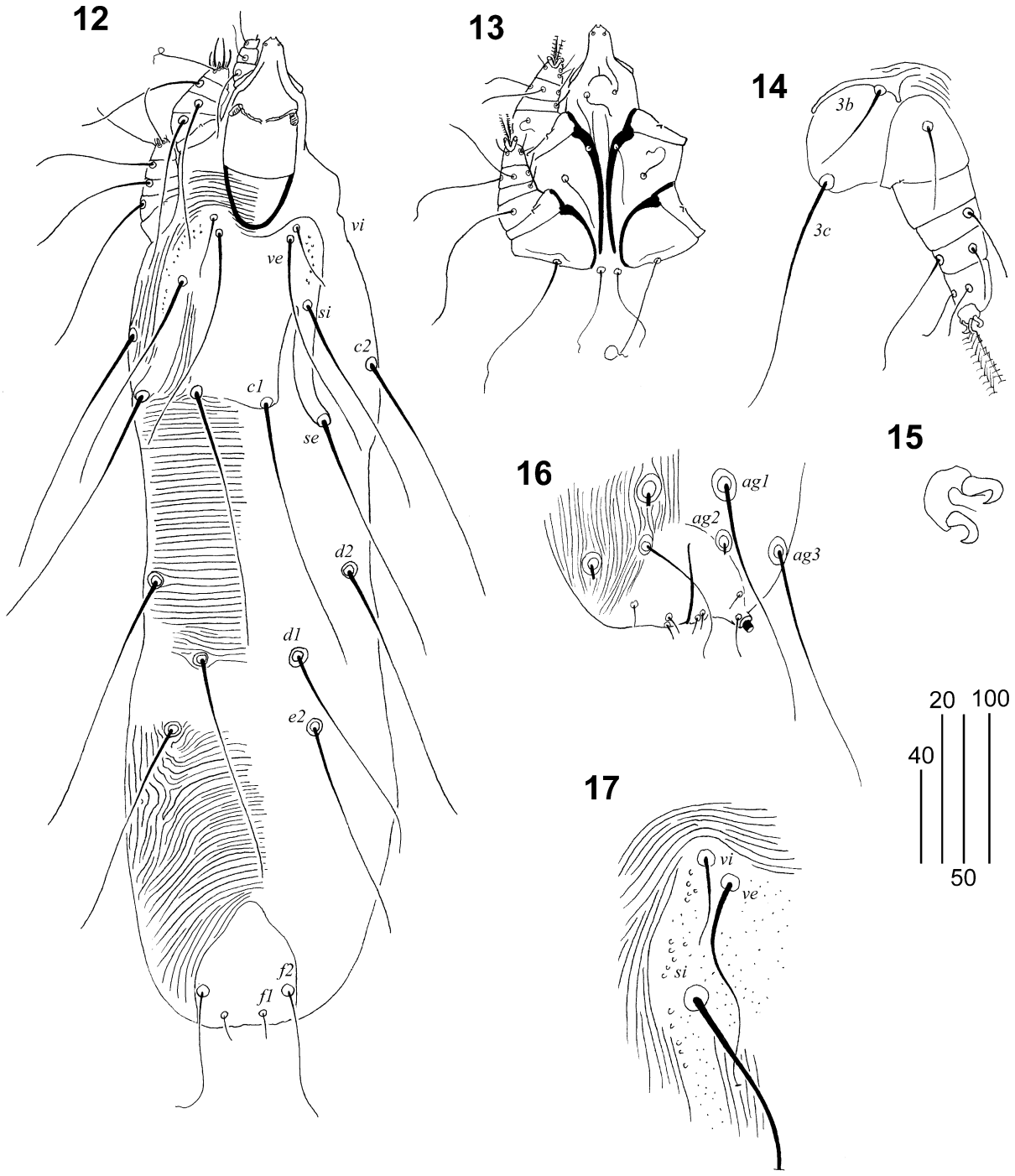
Genus *Rafapicobia* Skoracki

Rafapicobia toxostoma sp. nov.

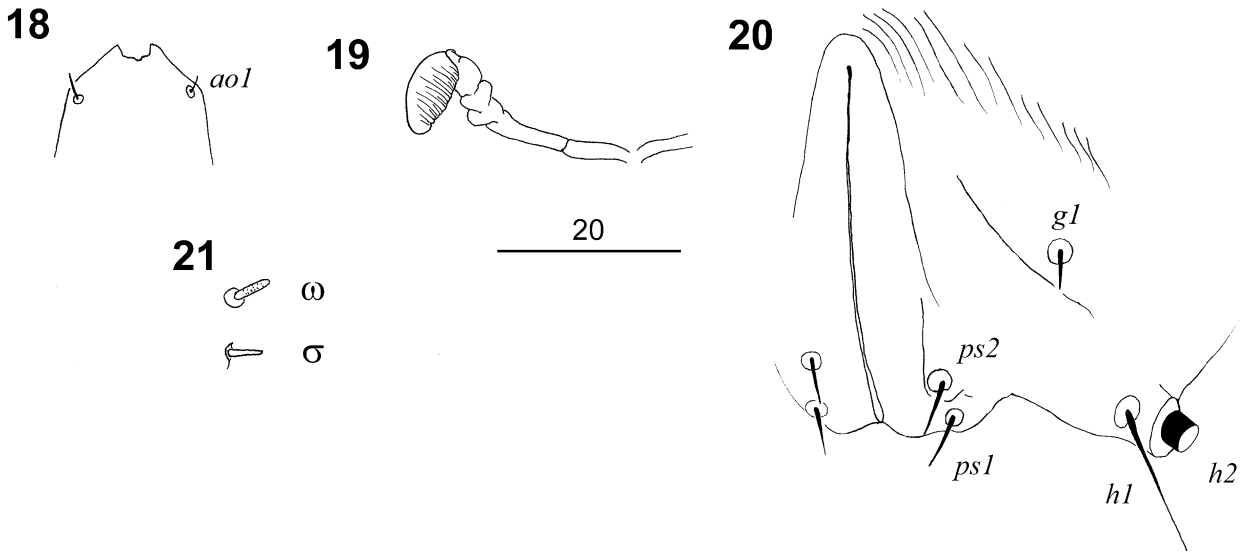
(Figs. 12–25)

Description. PHYSOGASTRIC FEMALE (holotype). Total body length 700 (590–700 in 5 paratypes). *Gnathosoma*. Hypostomal apex tapering. Infracapitulum apunctate. Each medial branch of peritremes with 5–6 chambers, each lateral branch short with poorly visible chambers. Movable cheliceral digit edentate in posterior part, 90 long. Stylophore apunctate, 110 (110–120) long. *Idiosoma*. Propodonotal shield entire, shirt-like, punctate at lateral margins, bearing bases of all propodonotal setae except *c2*. Setae *vi* situated anterior to level of setae *ve*. All propodonotal setae lightly beaded. Length ratio of setae *vi*:*ve*:*si* 1:2.3–3:5–5.6. Setae *c1* and *se* located at same transverse level. Hysteronotal shield absent. Setae *d1* situated closer to setae *e2* than to *d2*. Pygidial shield well developed, apunctate. Setae *f2* about 5 times as long as *f1*. Setae *f1* and *h1* subequal in length. Setae *h2* 3.3 times longer than *f2*. Aggenital plate absent. Genital plate present, bases of setae ag2 situated at lateral margins of this

plate. Aggenital setae *ag1* situated anterior to level of setae *ag2*. Length ratio of setae *ag1*:*ag2*:*ag3* 2.3:1:1.6–1.8. Setae *ps1* and *ps2* minute and subequal in length. Coxal fields I–IV well developed, apunctate. Setae *3c* about 3 times longer than *3b*. *Legs*. Most of dorsal setae of legs I and II, beaded. Antaxial and paraxial members of claws pair III and IV subequal in size. Setae *tc'III–IV* and *tc"III–IV* subequal in length. *Lengths of setae: vi* 30 (30), *ve* 75 (75–105), *si* 150 (150–155), *se* 180 (170–180), *c1* 185 (160–190), *c2* 175 (170–180), *d1* 170 (150–165), *d2* 180 (160–180), *e2* 160 (130–150), *f1* 15 (15), *f2* (70–80), *h1* (15), *h2* 250 (230–255), *ag1* 115 (115–125), *ag2* (45–60), *ag3* (80–90), *ps1* and *ps2* (5), *g1* 7 (5–7), *tc'III–IV* 65 (55–65), *tc"III–IV* 65 (65), *3b* 35 (25–35), *3c* 85 (75–85), *4b* 35 (30–35), *4c* 100 (95–100), *dTIII–IV* 80 (80), *l'RIII* 35 (30–35), *l'RIV* 35 (35–35).



FIGURES 12–17. *Rafapicobia taxostoma* **sp. nov.**, female. **12**, dorsal view; **13**, propodosoma in ventral view; **14**, leg III in ventro-lateral view; **15**, claws of leg III; **16**, opisthosoma in ventral view; **17**, anterior part of propodonotal shield.



FIGURES 18–21. *Rafapicobia taxostoma* **sp. nov.**, female. **18**, hypostomal apex; **19**, peritreme; **20**, genito-anal region; **21**, solenidia of leg I.

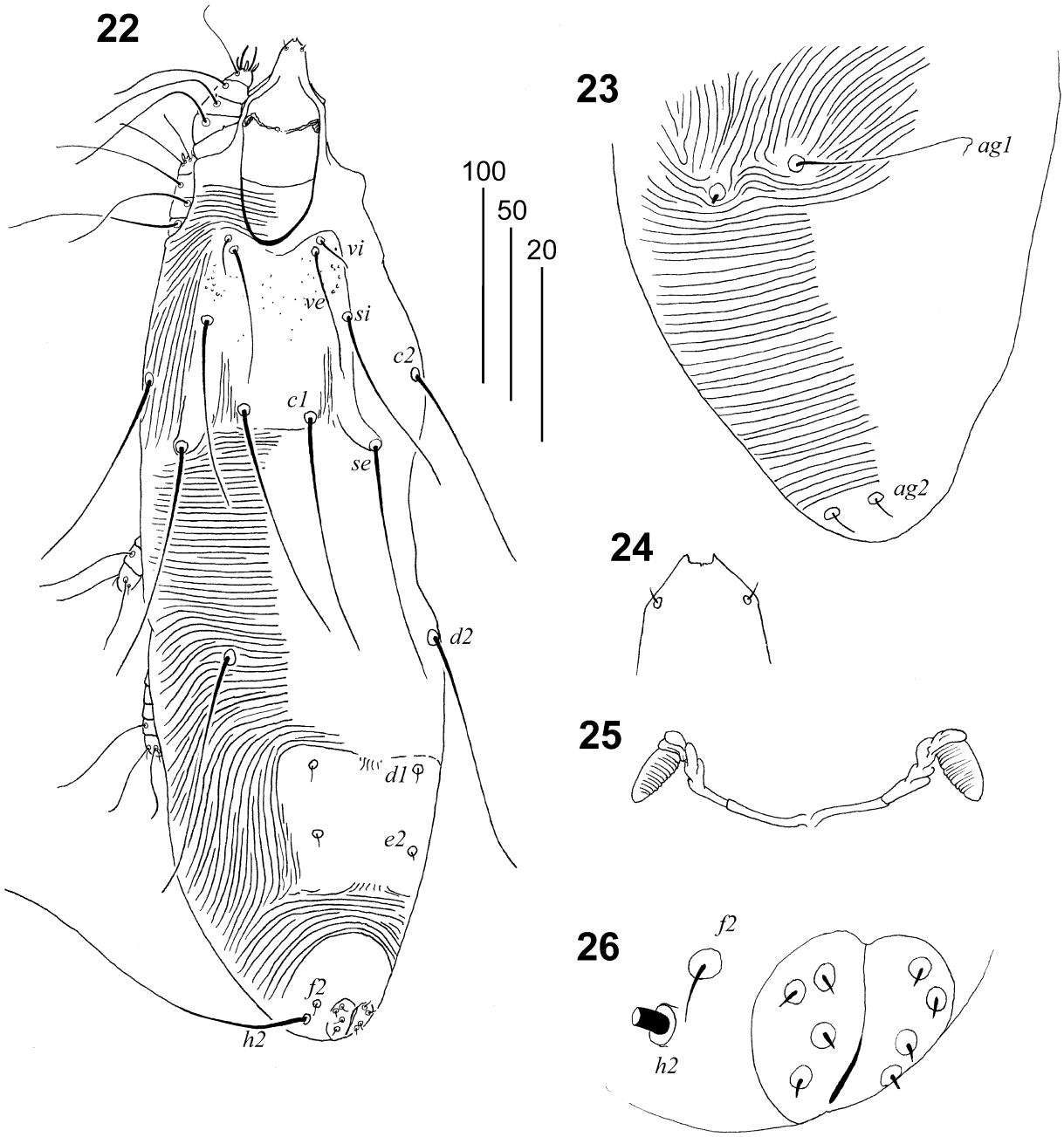
MALE (4 paratypes). Total body length 445–525. *Gnathosoma*. Infracapitulum apunctate. Hypostomal apex tapering. Each medial branch of peritremes with 5 chambers, each lateral branch short with poorly visible chambers. Movable cheliceral digit edentate in posterior part. Stylophore apunctate, 105 long. *Idiosoma*. Propodonotal shield entire, shirt-like, concave on anterior margin, bearing all propodonotal setae except *c2*, punctate. Setae *vi* situated anterior to level of setae *ve*. All propodonotal setae lightly beaded. Length ratio of setae *vi*:*ve*:*si* 1:3.2:4.8–5.3. Setae *c1* located anterior to level of setae *se*. Hysteronotal shield entire, well sclerotized, not fused to pygidial shield. Setae *d2* about 25 times longer than *d1* and *e2*. Pygidial shield well developed, apunctate. Setae *h2* 29–33 times longer than *f2*. Aggenital plate absent. Length ratio of setae *ag1*:*ag2* 5.5:1. Coxal fields I–IV well developed, apunctate. Setae *3c* 3 times longer than *3b*. *Legs*. Most of dorsal setae of legs I and II lightly beaded. Antaxial and paraxial members of claws pair III and IV subequal in size. Setae *tc'* and *tc"* of legs III–IV subequal in length. *Lengths of setae: vi* 20, *ve* 65, *si* 95–105, *se* 120–140, *c1* 120–130, *c2* 115–120, *d1* 5, *d2* 105–125, *e2* 5, *f2* 5, *h2* 145–165, *ag1* 55, *ag2* 10, *3b* 25–30, *3c* 65–75, *l'RIII* 20, *l'RIV* 20, *dTIII–IV* 55.

Type material. Female holotype (physogastric form) and paratypes: 6 females (physogastric form), 7 males, 3 nymphs and 1 egg (AMU–SYR.334) from *Toxostoma curvirostre* (Swainson); **UNITED STATES**, Texas, Webb Co., Laredo, 29 March 1962, coll. L.W. Oring. Mites removed by M. Skoracki.

Type deposition. All material is deposited in the AMU, except 1 female and 1 male in the ZISP and 1 female in the ZSM.

Etymology. The name *toxostoma* refers to the generic name of the host – *Toxostoma*.

Differential diagnosis. The genus *Rafapicobia* was known only from the type species *R. zirnitra* Skoracki, 2011 described from *Saxicola rubetra* (Linnaeus) (Sylviidae) and *Ficedula hypoleuca* (Pallas) (Sylviidae) from Poland (Skoracki 2011). This new species differs from the type species by the following characters: in females of *R. toxostoma* **sp. nov.**, the lengths of setae *ve*, *si* and *f2* are 75–105, 150–155 and 70–80 respectively; the propodonotal shield is entire; in males the length ratio of setae *vi*:*ve*:*si* is 1:3.2:4.8–5.3; the hysteronotal shield is not divided. In females of *R. zirnitra*, the lengths of setae *ve*, *si* and *f2* are 65, 80–90 and 50–55 respectively; the propodonotal shield is divided into three shields; in males the length ratio of setae *vi*:*ve*:*si* is 1:2.3:3.7; the hysteronotal shield is divided longitudinally.



FIGURES 22–26. *Rafapicobia taxostoma* **sp. nov.**, male. 22, dorsal view; 23, opisthosoma in ventral view; 24, hypostomal apex; 25, peritremes; 26, genito-anal region.

Acknowledgements

We wish to thank the head of ZSM - Prof. Gerhard Haszprunar and the staff of the ornithological section: Ruth Diesner and Markus Unsoeld for making available samples of dry bird skins for the present study. We also sincerely thank our friends Dr. Richard Kraft and his wife Marianne Kraft for their enormous assistance and logistic help. This work was financially supported by the Polish Committee for Scientific Research (Grant No. NN 303802540).

References

Bochkov, A.V., OConnor, B.M. & Wauthy, G. (2008) Phylogenetic position of the family Myobiidae within the Prostigmata (Acari: Acariformes). *Zoologischer Anzeiger*, 247, 15–45.

Casto, S.D. (1974) Quill wall thickness and feeding of *Syringophiloidus minor* (Berlese) (Acarina: Syringophilidae). *Annals of the Entomological Society of America*, 67, 824.

Clements, J.F. (2007) *The Clements Checklist of Birds of the World.* 6th Edition, Cornell University Press, Ithaca, 864 pp.

del Hoyo, J., Elliot, A. & Christie, D.A. (2005) *Handbook of the birds of the World. Vol. 10.* Lynx Edicions Press, Barcelona, 895 pp.

Grandjean, F. (1939) Les segments postlarvaires de l'hysterosoma chez les oribates (Acariens). *Bulletin de la Société Zoologique de France*, 64, 273–284.

Grandjean, F. (1944) Observations sur les acariens de la famille Stigmaedae. *Archives des Sciences Physiques et Naturelles*, 26, 103–131.

Kethley, J.B. (1970) A revision of the family Syringophilidae (Prostigmata: Acarina). *Contributions of the American Entomological Institute*, 6, 1–76.

Kethley, J.B. (1971) Population regulation in quill mites (Acarina: Syringophilidae). *Ecology*, 52, 1113–1118.

Kethley, J.B. (1990) Acarina: Prostigmata (Actinedida). *In*: Dindal, D.L (Ed.), *Soil Biology Guide*. Wiley and Sons, New York, 667–754 pp.

Skoracki, M. (2011) Quill mites (Acari: Syringophilidae) of the Palaearctic region. *Zootaxa*, 2840, 1–415.

Skoracki, M. & Dabert, J. (2001) The quill mites of the genus *Syringophilopsis* Kethley, 1970 (Acari, Syringophilidae) from African birds. *Acarina*, 9, 105–112.

Skoracki, M. & OConnor, B.M. (2010) New taxa of quill mites (Acari: Cheyletoidea: Syringophilidae). *Zootaxa*, 2341, 1–32.