

# A new genus of ectoparasitic mites of the family Syringophilidae (Acari, Cheyletoidea) from the treeswifts (Apodiformes, Hemiprocnidae)

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## Abstract

A new genus of syringophilid mites (Acari, Syringophilidae) and two new species are described from the treeswifts (Apodiformes, Hemiprocnidae). *Apodisyngiana* gen. nov. is closely related to *Philoxanthorinea* Kethley and distinguished by the presence of following characters: propodosomal setae are arranged 2-1-2-1; leg setae *vs*'I are present, *IGIV* are absent. This new genus includes two new species: *A. haszprunari* sp. nov. from *Hemiprocne comata* (Temminck, 1824) from Sumatra and *A. mystaceae* sp. nov. from *Hemiprocne mystacea aeroplanes* Stresemann, 1921 and *H. m. mystacea* (Lesson, 1827), both from Papua New Guinea.

## Key words

Syringophilidae, quill mites, ectoparasites, Apodiformes, taxonomy

## Introduction

The family Syringophilidae (Acari, Cheyletoidea) is a poorly known group of bird ectoparasites. Although, to this time was described no more than 170 species grouped in 33 genera (Fain *et al.* 2000; Bochkov *et al.* 2004; Skoracki and Sikora 2004a, b) the real number of extant species might include at least 5000 species (Johnston and Kethley 1973).

Syringophilid mites are known from about 180 bird species belonging to 55 families and 18 orders. Among them, the only species reported from hosts of the order Apodiformes is *Syringophiloidus cypsiuri* Fain, Bochkov et Mironov, 2000 described from *Cypsiurus parvus* (Licht., 1823) (Apodidae) (Fain *et al.* 2000).

In the present paper, two new species found on the treeswifts (Hemiprocnidae): *A. haszprunari* sp. nov. from *Hemiprocne comata* (Temminck, 1824) from Sumatra and *A. mystaceae* sp. nov. from *Hemiprocne mystacea aeroplanes* Stresemann, 1921 and *H. m. mystacea* (Lesson, 1827) both from Papua New Guinea are described.

## Materials and methods

The syringophilids were acquired from the bird collection (dry skins) kept at the Zoologische Staatssammlung München (Germany) (ZSM). Mites were mounted on microslides in a polyvinyl lactophenol medium and examined with the Nomarsky interference contrast phase with an Olympus BH2 microscope.

The nomenclature of idiosomal setae follows Fain (1979) in the version adapted for the family Syringophilidae (Bochkov and Mironov 1998) and the chaetotaxy for the legs is that of Grandjean (1944). Format of generic and species description is after Kethley (1970). Bird taxonomy follows that of Howard and Moore (1991). All measurements in descriptions are in micrometres ( $\mu\text{m}$ ). The holotypes and most of the paratypes are deposited at the Department of Animal Morphology, A. Mickiewicz University, Poznań, Poland (UAM). Some paratypes are deposited at the ZSM and Zoological Institute of the Russian Academy of Sciences, St. Petersburg, Russia (ZIN).

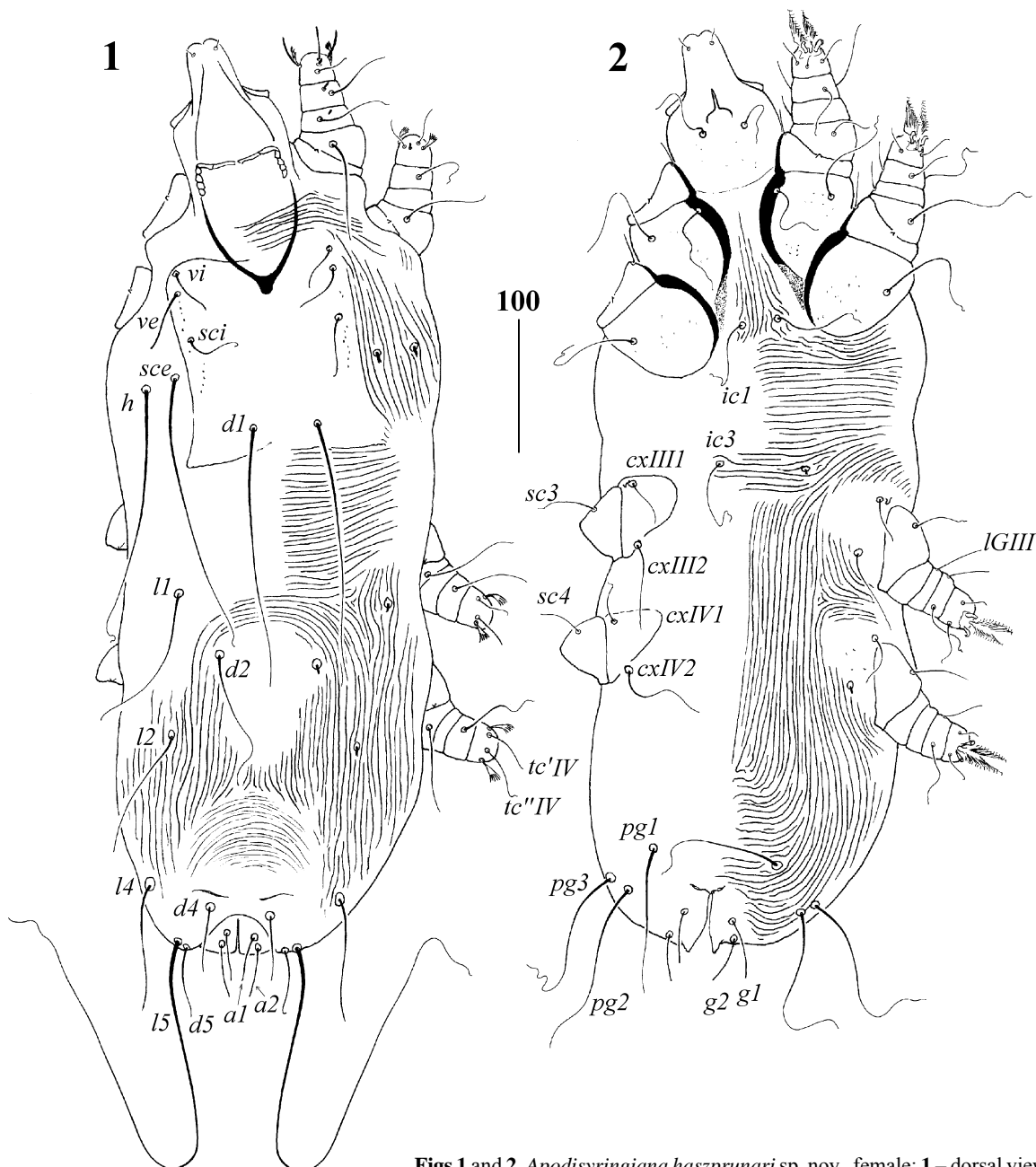
## Results

Family: Syringophilidae Lavoipierre, 1953  
Subfamily: Syringophilinae Lavoipierre, 1953

### *Apodisyringiana* gen. nov.

Female: Small sized syringophilids, approximately 480–630. Gnathosoma: Hypostomal apex smooth, without protuberances, hypostomal lips finger-like, with 2 pairs of small protuberances. Chelicerae edentate. Peritremes M-shaped. Lateral hy-

postomal teeth absent. Stylophore slightly constricted posteriorly. Idiosoma: All idiosomal setae smooth. Propodosomal shield well developed, entire, rectangular in shape. Hysterosomal and pygidial shields present. Prodorsum with 6 pairs of setae, arranged 2 (*vi*, *ve*) – 1 (*sci*) – 2 (*h*, *sce*) – 1 (*d1*). Setae *d4* and *d5* short, less than 1/10 of whip-like setae *l5*. Genital (*g1*, *g2*) and anal (*a1*, *a2*) series with 2 pairs of setae. Three pairs of paragenital setae (*pg1*–*pg3*) present. Legs: All legs subequal in size. Epimeres I divergent, fusion of epimeres I and II indistinct. Fan-like setae *p'* and *p''* of legs I–IV multiserrate. Setae *dGII*, *vs''II* and *lGIV* absent. Antaxial and



**Figs 1 and 2.** *Apodisyringiana haszprunari* sp. nov., female: **1** – dorsal view, **2** – ventral view

paraxial members of claw pair small and similar in shape, without basal angle.

Male: Propodosomal shield weakly sclerotized. Setae *d5* less than 1/6 of setae *l5*. Two pairs of paragenital setae (*pg1*, *pg2*) present. Other generic characters as in female.

#### Differential diagnosis

This new genus is closely related to the genus *Philoxanthor-nea* Kethley, 1970 associated with charadriiform birds of the family Laridae and Sternidae (Kethley 1970, Bochkov and Mironov 1998). In both genera, the hypostomal apex is smooth, the chelicerae are edentate, all idiosomal setae are smooth, leg setae *dGII* and *vs'II* are absent, posterior ends of epimeres I are divergent. *Apodisyringiana* gen. nov. is distinguished from *Philoxanthor-nea* by the following characters: in

both sexes, the propodosomal setae are arranged 2-1-2-1; leg setae *vs'I* are present, *IGIV* are absent. In both sexes of *Philoxanthor-nea*, the propodosomal setae are arranged 2-2-2; leg setae *vs'I* are absent, *IGIV* are present.

Type species: *Apodisyringiana haszprunari* sp. nov.

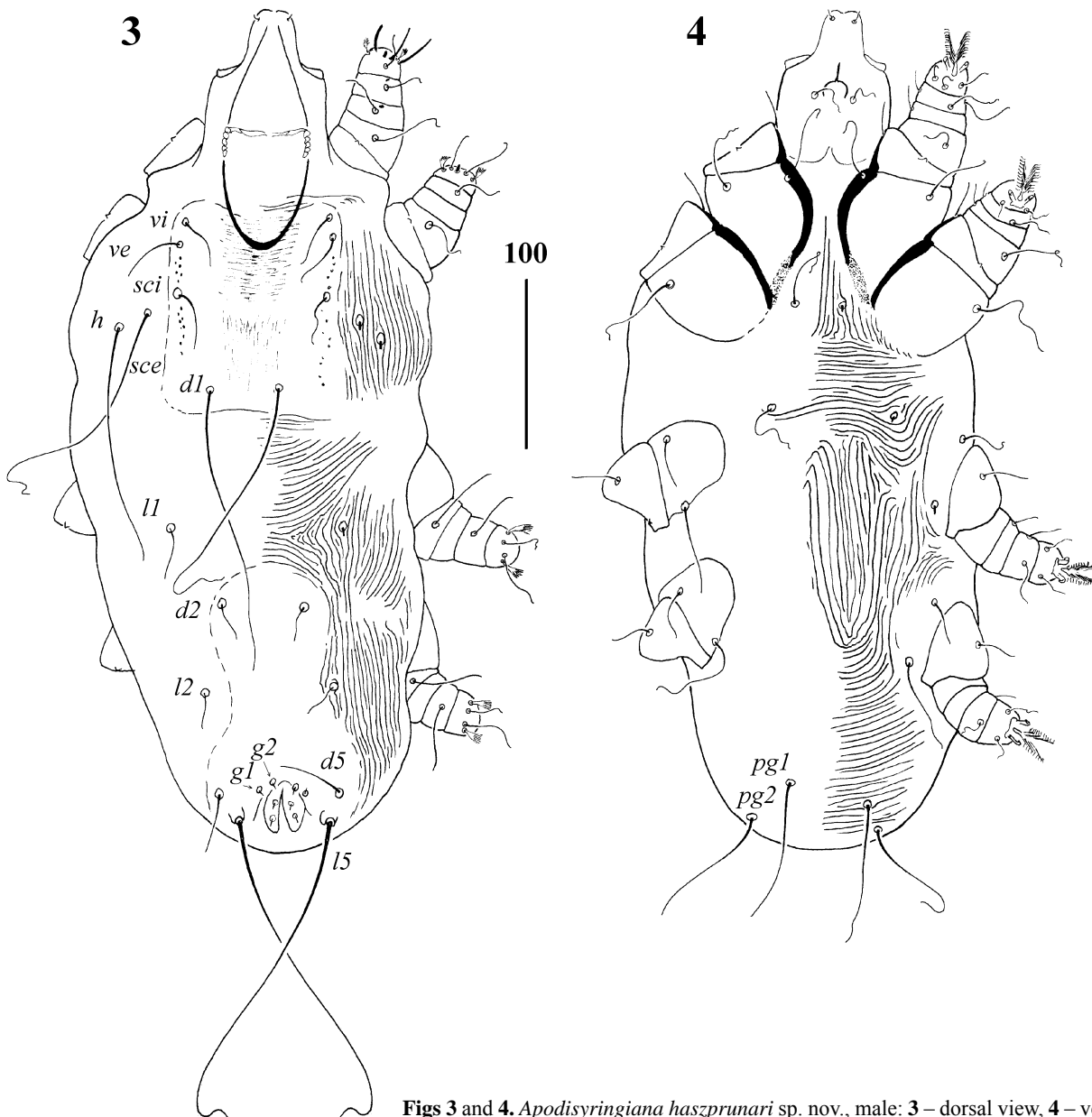
Host order: Apodiformes.

Habitat: Quills of secondary feathers.

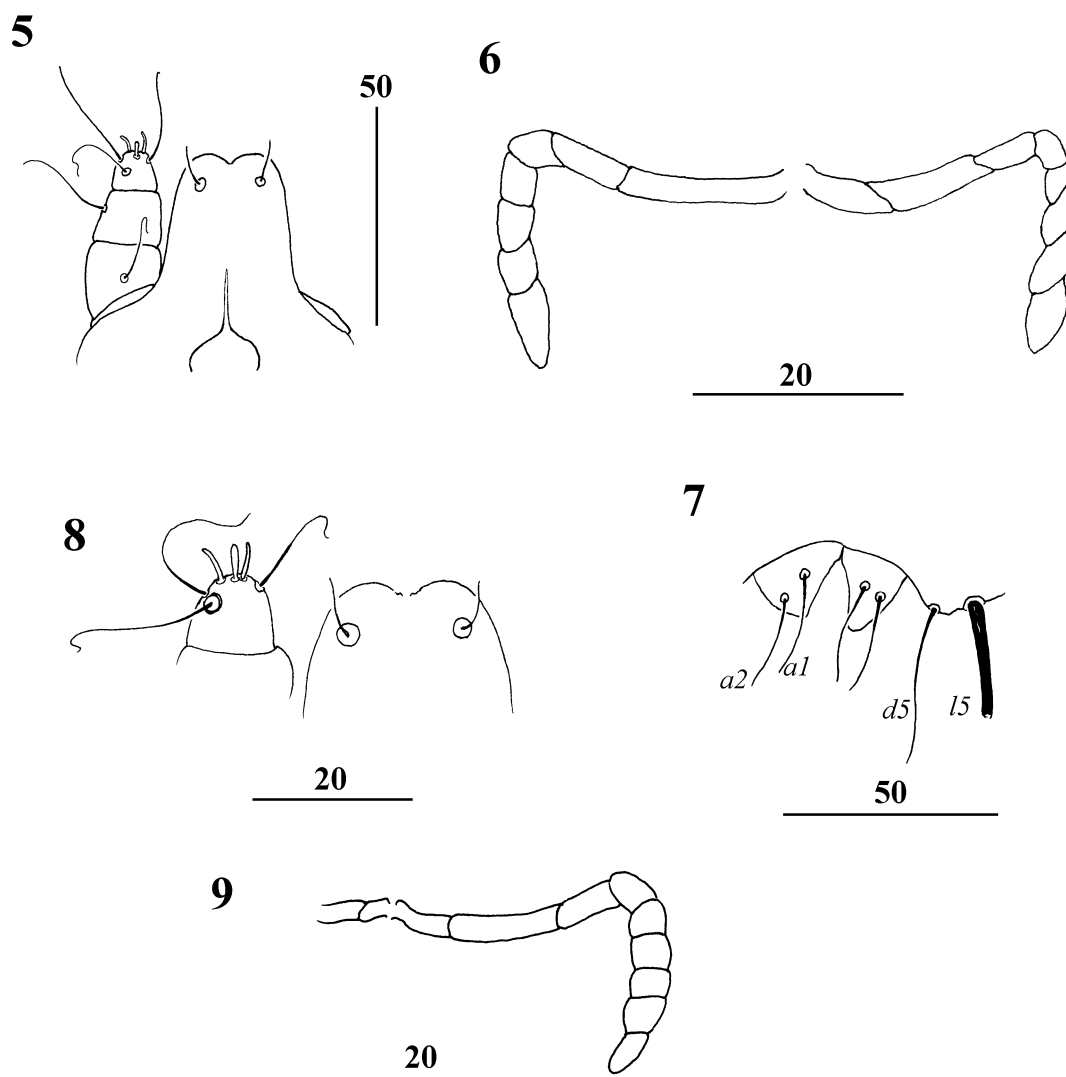
Etymology: This generic name is derived from the name of bird order (Apodiformes) hosting mites of this genus.

#### *Apodisyringiana haszprunari* sp. nov. (Figs 1–9)

Female: Total body length of holotype 630 (560–630 in six paratypes). Gnathosoma: Hypostomal apex rounded (Fig. 5). Chelicerae 130 (120–130) long. Stylophore slightly constrict-



**Figs 3 and 4.** *Apodisyringiana haszprunari* sp. nov., male: **3** – dorsal view, **4** – ventral view



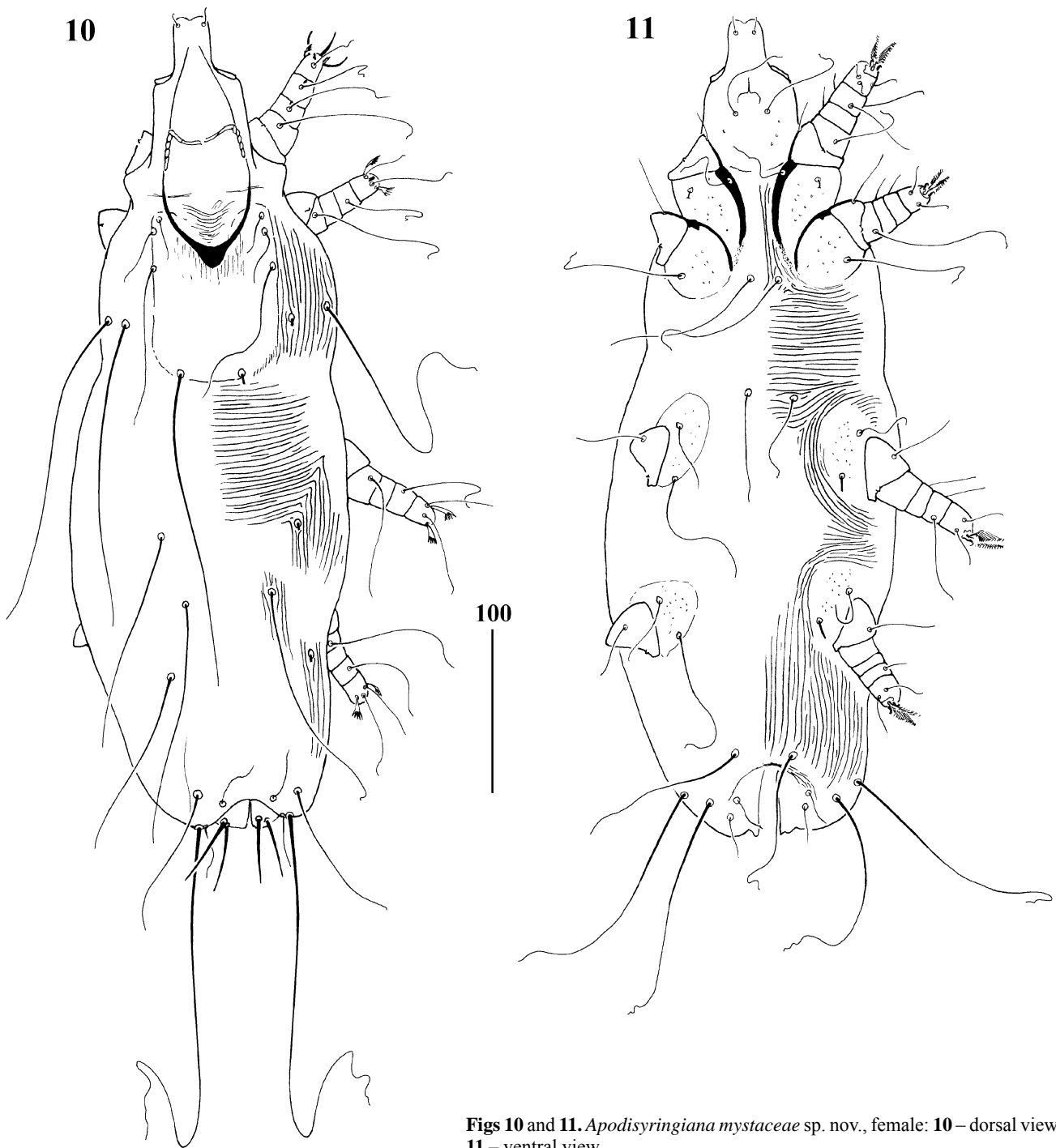
**Figs 5–9.** *Apodisyngiana haszprunari* sp. nov., female: **5** – gnathosoma, ventral view; **6** – peritremes; **7** – anal region of male; **8** – gnathosoma, ventral view; **9** – peritremes

ed posteriorly, 155 (155–160) long. Each transverse branch of peritremes with 3 chambers, each longitudinal branch with 4–5 chambers (Fig. 6). Idiosoma: Propodosomal shield well sclerotized, punctated near lateral margins, bearing bases of setae *vi*, *ve*, *sci* and *d1*. Setae *vi*, *ve* and *sci* subequal in length, their ratio to setae *sce* and *d1* 1:4.5–5. Bases of setae *sce* situated anterior to level of bases of setae *d1*. Hysterosomal shield well sclerotized, bearing bases of setae *d2*. Pygidial shield weakly sclerotized not fused to hysterosomal shield. Bases of setae *d2* situated equidistant to bases of setae *l1* and *l2*. Setae *l5* 3.5 times longer than *l4*. Setae *l4* 2.5–3 times longer than *d4* and *d5*. Anal (*a1*, *a2*) setae thin and hair-like (Fig. 7). Anal and genital (*g1*, *g2*) setae subequal in length. Paragenital setae *pg2* and *pg3* subequal in length, 1.5 times longer than *pg1*. Cuticular striations as in Figures 1 and 2. Legs: All coxae well sclerotized. Epimeres I with poorly dis-

tinct fusion to epimeres II (Fig. 2). Setae *sc2* and *sc3* subequal in length. Seta *sc3* extent to tibia. Fan-like setae *p'* and *p''* of legs III and IV with 6–7 tines. Setae *tc'''III–IV* 1.5 times longer than *tc'''III–IV*. Coxal setae *cxIII2* 1.5 times longer than *cxIII1*.

Length of setae: *vi* 30 (30); *ve* 35 (35–40); *sci* 35 (35–40); *h* 160 (160–185); *sce* 160 (160–180); *d1* 165 (165–175); *l1* (90–110); *d2* (85); *l2* (70); *d4* 45 (40–45); *d5* 40 (35–40); *l4* (100); *l5* (340–345); *a1* and *a2* 30 (25–30); *g1* and *g2* 25 (25–30); *pg1* (80–100); *pg2* 160 (135–160); *pg3* (135–160); *sc2* 30; *sc3* 35 (30–35); *sc4* (30); *cxIII1* 35 (35–45); *cxIII2* (60); *tc'''III–IV* 30 (30–40); *tc'''III–IV* 50 (50–60).

Male: Total body length 495–510 in 3 paratypes. Gnathosoma: Hypostomal apex rounded (Fig. 8). Chelicerae 110 long. Stylophore slightly constricted posteriorly, 145 long. Each transverse branch of peritremes with 3 chambers, each longitudinal branch with 6 chambers (Fig. 9). Idiosoma: Pro-



**Figs 10 and 11.** *Apodisyringiana mystaceae* sp. nov., female: **10** – dorsal view, **11** – ventral view

podosomal shield weakly sclerotized, punctated near lateral margins, bearing bases of setae *vi*, *ve*, *sci* and *d1*. Setae *vi*, *ve* and *sci* subequal in length. Setae *sce* situated anterior to level of setae *d1* and anterior to level of setae *h*. Hysterosomal shield fused with pygidial shield, bearing bases of setae *d2*, *d5* and *l5*. Cuticular striations as in Figures 3 and 4. Legs: All coxae well sclerotized. Epimeres I with poorly distinct fusion to epimeres II (Fig. 4).

Length of setae: *vi* 25; *ve* 25–35; *sci* 35; *h* 145–175; *sce* 170; *d1* 155–170; *d5* 35; *l5* 220; *pg1* 80; *pg2* 90; *sc1* 12; *sc2* 30; *sc3* 35; *sc4* 25–30; *cxIII1* 30; *cxIII2* 55; *tc'''III–IV* 25; *tc'''III–IV* 30.

Type material: Female holotype (Syr.146), paratypes: 11 females, 3 males and 1 nymph from *Hemiprocne comata* (Temminck, 1824) (Hemiprocnidae); Sumatra; May–June 1905; leg. B. Hagen. The host specimen is deposited at ZSM.

The holotype and 8 female paratypes and 2 male paratypes are deposited at UAM, 2 female and 1 male paratypes at ZSM, 1 female paratype at ZIN.

Etymology: The name *haszprunari* is dedicated to Gerhard Haszprunar – Professor of Systematic Zoology and Director of the Zoological State Collection in Munich (Germany).

Differential diagnosis: See below.

***Apodisyringiana mystaceae* sp. nov.** (Figs 10–21)

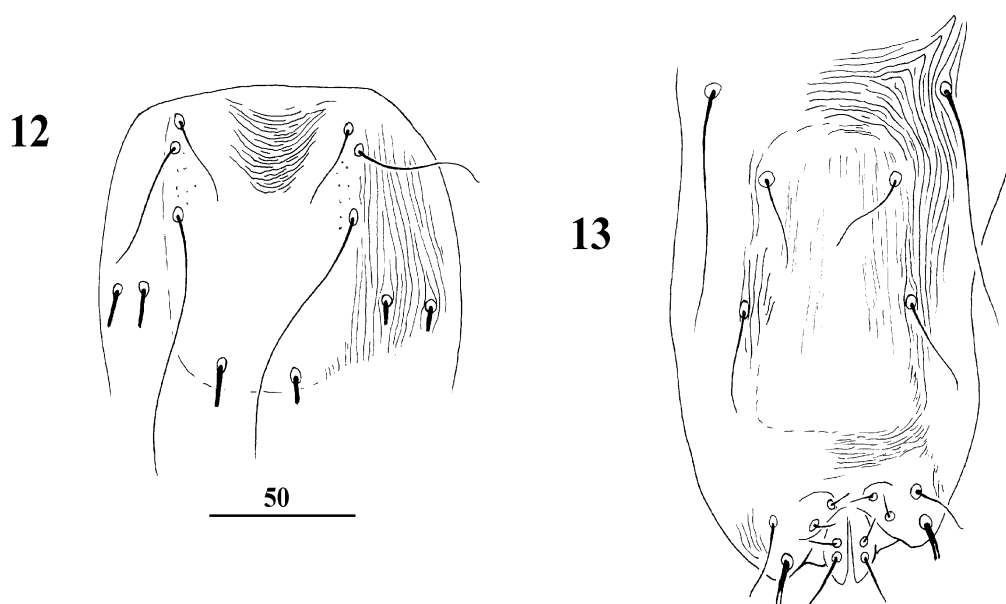
Female: Total body length of holotype 520 (485–515 in three paratypes). Gnathosoma: Hypostomal apex rounded (Figs 14 and 15). Chelicerae 120 (115) long. Stylophore slightly constricted posteriorly, 160 (150–160) long. Each transverse branch of peritremes with 2–3 chambers, each longitudinal branch with 4–5 chambers (Fig. 16). Idiosoma: Propodosomal shield well sclerotized, punctated near lateral margins, with deeply concave anterior margin, bearing bases of setae *vi*, *ve*, *sci* and *d1*. Length ratio of setae *vi:ve:sci* 1:1.2–1.5:2.5–3.3. Bases of setae *sce* set anterior to level of *d1*. Hysterosomal shield present, fusion with pygidial shield poorly distinct. Bases of setae *d2* situated equidistant to bases of setae *l1* and *l2*. Setae *l5* 3 times longer than *l4*. Setae *l4* 3–3.5 times longer than *d4* and *d5*. Anal (*a1* and *a2*) setae stouter and about twice longer than genital (*g1* and *g2*) setae (Fig. 18). Setae *pg1* slightly shorter than *pg2*, setae *pg2* somewhat shorter than *pg3*. Cuticular striations as in Figures 10 and 11. Legs: All coxae well sclerotized. Epimeres I with indistinct fusion to epimeres II (Fig. 11). Fan-like setae *p'* and *p''* of legs III and IV with 8–10 tines (Fig. 17). Setae *tc'''III–IV* 2 times longer than *tc'III–IV*. Coxal setae *cxIII2* 2.3 times longer than *cxIII1*.

Length of setae: *vi* 30 (30–40); *ve* 45 (45–55); *sci* 100 (105–120); *h* 190 (190–205); *sce* 190 (195–230); *d1* 205 (220–240); *d2* 130 (145–160); *d4* 35 (35–45); *d5* 30 (30); *l5* 305; *pg1* 130 (135); *pg2* 145 (150); *pg3* 165 (145–170); *a1* and *a2* 45 (45); *g1* and *g2* 25 (20–30); *sc2* 35 (35); *sc3* 35 (30–35); *sc4* 35; *cxIII1* 45 (45); *cxIII2* 105 (110–125); *tc'''III–IV* 35 (25–35); *tc'III–IV* (60).

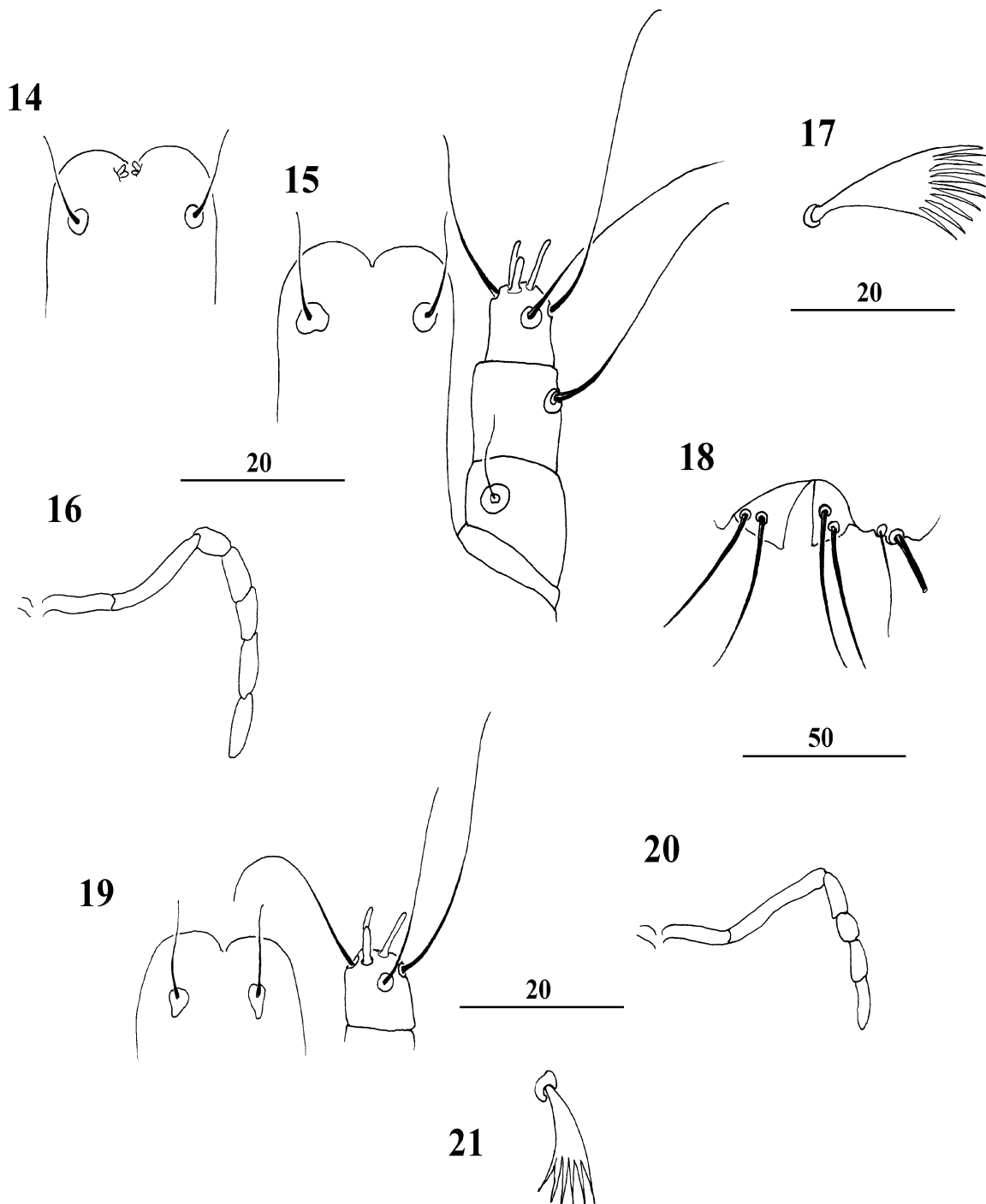
Male: Total body length 430 in one paratype. Gnathosoma: Hypostomal apex rounded (Fig. 19). Chelicerae 115 long. Stylophore slightly constricted posteriorly, 105 long. Each transverse branch of peritremes with 2–3 chambers, each longitudinal branch with 4–5 chambers (Fig. 20). Idiosoma: Propodosomal shield weakly sclerotized, concave on anterior margin, bearing bases of setae *vi*, *ve*, *sci* and *d1*, punctated near bases of setae *ve* and *sci* (Fig. 12). Setae *vi*, *ve* subequal in length or setae *vi* slightly shorter than *ve*, their ratio to setae *sci* 1:2.5–3. Bases of setae *sce* and *h* situated at the same level. Hysterosomal shield present, weakly sclerotized, margins indistinct, not fused with pygidial shield, bearing bases of setae *d2* (Fig. 13). Setae *l1* 2–3 times longer than *l2* and *d2*. Cuticular striations as in Figures 12 and 13. Legs: All coxae well sclerotized, scarcely punctated. Epimeres I with poorly distinct fusion to epimeres II. Setae *cxIII2* about 2–2.5 times longer than *cxIII1*; setae *tc'''III–IV* twice longer than *tc'III–IV*. Fan-like setae *p'* and *p''* of legs I–IV with 5–6 tines (Fig. 21).

Length of setae in three paratypes: *vi* 25–35; *ve* 35; *sci* 70–85; *h* 135–155; *sce* 135; *d1* 170; *d2* 30–35; *d5* 25; *l1* 65–80; *l2* 30–35; *l5* 240–260; *pg1* 80–110; *pg2* 65–75; *sc1* 20; *sc2* 30–35; *sc3* 30–35; *sc4* 20–25; *cxIII1* 35; *cxIII2* 70–90; *tc'''III–IV* 20; *tc'III–IV* 45.

Type material: Female holotype (Syr.150) and paratypes: 5 females, 3 males, 5 nymphs from *Hemiproctne mystaceae*



**Figs 12 and 13.** *Apodisyringiana mystaceae* sp. nov., male: **12** – propodosoma, dorsal view; **13** – hysterosoma, dorsal view



**Figs 14–21.** *Apodisyringiana mystaceae* sp. nov., female: **14** – hypostomal apex in dorsal view; **15** – gnathosoma, ventral view; **16** – peritreme; **17** – fan-like seta of tarsus IV; **18** – anal region of male; **19** – ventral part of gnathosoma; **20** – peritreme; **21** – fan-like seta of tarsus IV

*aeroplanes* Stresemann, 1921 (Apodiformes: Hemiprocnidae); Papua New Guinea, New Britain Island; date unknown; leg. Hahl. The host specimen is deposited at ZSM. The holotype and 2 female, 2 male and 3 nymph paratypes are deposited at UAM, 2 female paratypes at ZSM, 1 female, 1 male and 2 nymph paratypes at ZIN.

Additional material: One female (Syr.153) from *Hemiprocne mystacea mystacea* (Lesson, 1827); Papua New Guinea; May 1910; leg. L. von Wiedefeld. The host specimen is deposited at ZSM. The female is deposited at UAM.

Etymology: The name *mystaceae* refers to the species name of the host.

*Differential diagnoses for species*

Two named species of this genus are distinguished from each other by characters as follow: in females of *A. haszprunari* sp. nov. the propodosomal shield is rectangular in shape, setae *vi*, *ve* and *sci* are subequal in length, anal and genital setae are subequal in length and thick. In males, hysterosomal setae *II*, *d2* and *l2* are subequal in length. In females of *A. mystaceae* sp. nov., the anterior margin of the propodosomal shield is deeply concave on anterior margin, the length ratio of setae *vi:ve:sci* 1:1.2–1.5:2.5–3.3, anal setae are distinctly stouter and about twice longer than genital setae; in males, the hysterosomal setae *II* are 2 times longer than *d2* and *l2*.

**Acknowledgements.** I would like to express my appreciation to Prof. Gerhard Haszprunar, Prof. Josef H. Reichholf, Dr. Richard Kraft and Dr. Stefan Friedrich (Zoologische Staatssammlung, München, Germany) for loaning the bird materials for the present study and help during work. I am also grateful to Prof. Czesław Błaszak (Department of Animal Morphology, UAM, Poland) for help in organizing my visit to ZSM and to Andrew Churchard (Warwick University, Coventry, U.K.) for correcting the English.

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(Accepted August 23, 2005)