DOI: 10.1515/ap-2015-0086

Acta Parasitologica, 2015, 60(4), 614–617; ISSN 1230-2821

DE GRUYTER

Stibarokris mariasi sp. nov. – a new quill mite species (Acariformes: Syringophilidae) parasitizing *Puffinus pacificus* (Gmelin) (Procellariidae) on Johnston Atoll

Eliza Glowska

Department of Animal Morphology, Faculty of Biology, Adam Mickiewicz University, Umultowska 89, 61-614 Poznań, Poland

Abstract

A new quill mite species *Stibarokris mariasi* sp. nov. (Acariformes: Syringophilidae) is described from the Wedge-tailed Shearwater *Puffinus pacificus* (Gmelin) (Procellariiformes: Procellariidae) from Johnston Atoll. Females of *S. mariasi* sp. nov. differ from most similar species *S. phoeniconaias* Skoracki and OConnor, 2010 by the longitudinal branch of the peritremes consisting of 11–14 chambers (*vs* 15–17 chambers in *S. phoeniconaias*), the movable cheliceral digit 145 long (*vs* 170), setal bases *c1* situated distinctly anterior to the level of setae *se* (*vs* setal bases *c1* and *se* situated at the same transverse level), the propodonotal shield punctate on the whole surface (*vs* propodonotal shield punctate at the lateral margins), the small, balloon-like hysteronotal shield, bearing bases of setae *d1* and densely punctate on the whole surface (*vs* hysteronotal shield bearing setal bases *d1* and *e2* and punctate at the anterior part), the pseudanal setae *ps1* 1.8 times longer than setae *ps2* (*vs* setae *ps1* and *ps2* subequal in length), subequal lengths of setae *h1* and *f1* (*vs* setae *h1* twice longer than *f1*) and the lengths of setae *ag1*, *ag2*, and *ag3* 145–170, 105–125, 120–165, respectively (*vs ag1*, *ag2* and *ag3* 245–285, 245–270, 330–340, respectively). A key to all known species of the genus *Stibarokris* Kethley, 1970 is proposed.

Keywords

Quill mites, ectoparasites, birds, systematics

Introduction

Quill mites (Acariformes: Syringophilidae) are permanent ectoparasites of birds whose life cycle proceeds mainly inside the quills of feathers. Syringophilids live and reproduce there and also feed by piercing quill walls using dagger-like chelicerae and sucking surrounding soft tissue. Up to now, the family has been represented by 334 species belonging to 60 genera, which were recorded from 482 bird species from 95 families and 24 orders (Glowska *et al*. 2015). The genus *Stibarokris* Kethley, 1970 so far has included four species recorded from phalacrocoracid (Suliformes), ciconiid (Ciconiiformes) and phoenicopterid (Phoenicopteriformes) birds in Germany, Russia, Botswana, and USA (Kethley 1970; Bochkov and Mironov 1999; Skoracki and OConnor 2010; Glowska and Skoracki 2011).

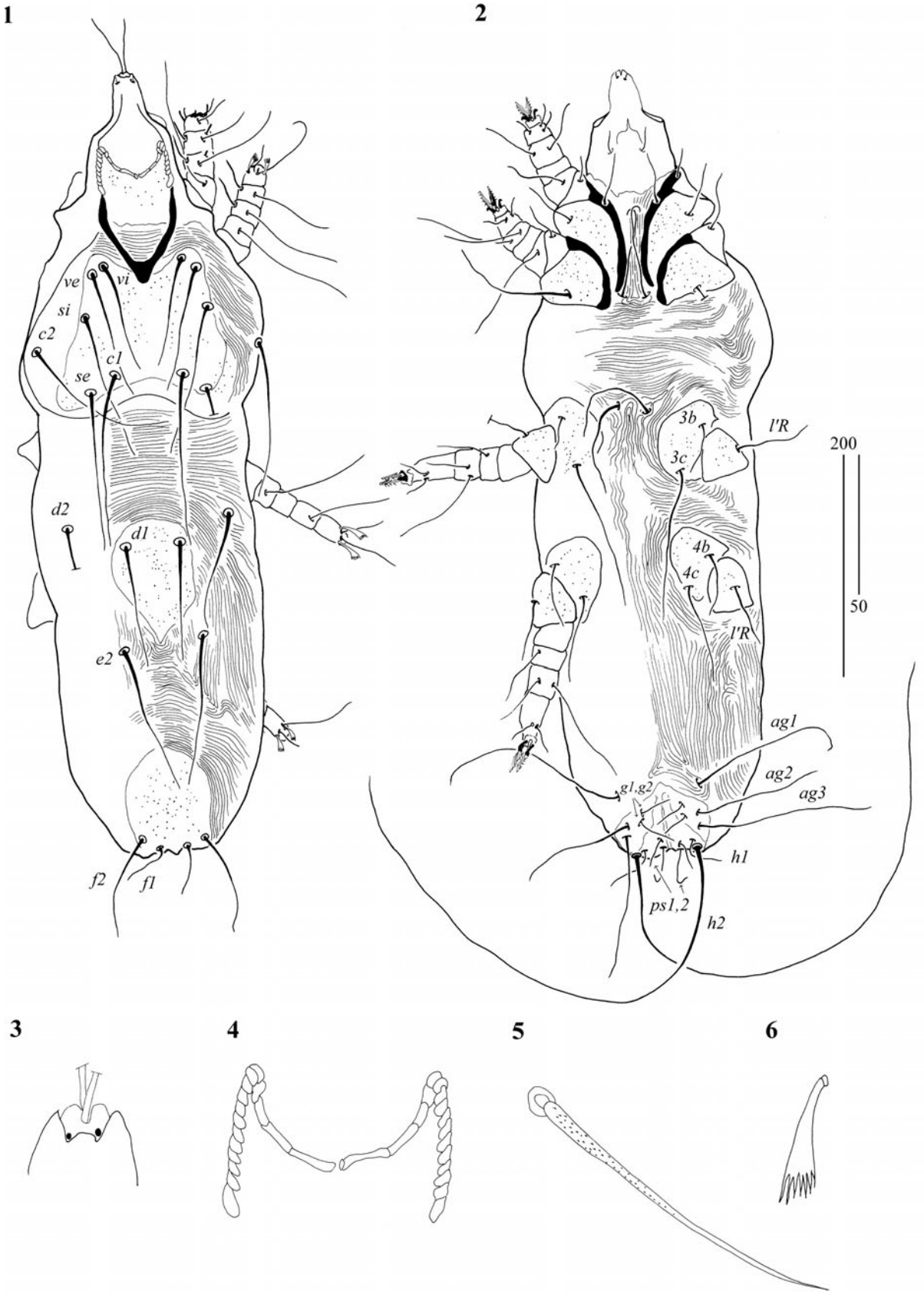
The order Procellariiformes is a group of colonial pelagic seabirds represented by 129 species widespread across the world's oceans and seas (Clements *et al.* 2014). This group of birds has been extremely poorly explored as for the presence of syringophilids. Only one species of quill mites *Procellariisyringophilus bulwerius* Kethley, 1970 has been found so far on the Bulwer's Petrel *Bulweria bulwerii* (Jardine and Selby) (Procellariidae) on Nihoa Island (USA) (Kethley 1970).

Here, a new quill mite species *Stibarokris mariasi* sp. nov. is described from the Wedge-tailed Shearwater *Puffinus pacificus* (Gmelin) (Procellariiformes: Procellariidae) on Johnston Atoll. A key to all known species of the genus *Stibarokris* Kethley, 1970 is proposed.

Materials and Methods

Material used in the study was acquired from the collection of feathers deposited in the Smithsonian Institution, National Museum of Natural History, Department of Vertebrate Zool-

*Corresponding author: glowska@amu.edu.pl



Figs 1–6. *Stibarokris mariasi* **sp. nov**., female: 1 – dorsal view, 2 – ventral view, 3 – hypostomal apex, 4 – peritremes, 5 – propodonotal setae *ve*, 6 – fan-like setae *p'* of leg IV. Scale bars: 1, 2 = 200 μm; 3–6 = 50 μm

ogy, Division of Birds, Washington, DC, USA (USNM). Bird specimen was trapped by the US Fish and Wildlife Service (2002) and mites were sampled by E. Glowska. Drawings were made with an Olympus BH2 microscope with differential interference contrast (DIC) optics and a camera lucida. All measurements are given in micrometres (μm). The idiosomal setation follows Grandjean (1939) with modifications adapted for Prostigmata by Kethley (1990). The system of nomenclature for leg setation follows that proposed by Grandjean (1944). The application of these chaetotaxic schemes to Syringophilidae was recently provided by Bochkov *et al.* (2008) with changes by Skoracki (2011). The Latin and common names of the birds follow Clements *et al.* (2014).

Results

Family Syringophilidae Lavoipierre, 1953
Subfamily Syringophilinae Lavoipierre, 1953
Genus *Stibarokris* Kethley, 1970

***Stibarokris mariasi* sp. nov.** (Figs. 1–6)

Description. FEMALE. Total body length in holotype 700 (670–750 in 4 paratypes). *Gnathosoma.* Infracapitulum apunctate. Lateral hypostomal teeth distinct and strongly sclerotized (Fig. 3). Each transverse branch of peritremes with 5–6 chambers, each longitudinal branch with 11–14 chambers (Fig. 4). Stylophore punctate, 195 (195–215) long. Movable cheliceral digit 145 long. *Idiosoma.* Propodonotal shield well sclerotized, punctate on whole surface, concave both on anterior and posterior margins. Length ratio of setae *vi:ve:si* 1:1–1.2:1.1–1.3. Bases of setae *c1* distinctly anterior to level of setae *se*. Dorsal idiosomal setae, except terminal setae *f1*, *f2*, *h1* and *h2*, strongly knobbed (Fig. 5). Hysteronotal shield well sclerotized, balloon-like in shape, bearing bases of setae *d1*, densely punctate. Length ratio of setae *d2:d1:e2* 1–1.4:1–1.3:1.1–1.5. Pygidial shield strongly sclerotized, densely punctate, bearing bases of setae *f1* and *f2*. Length ratios of setae *f1:f2* 1:2–2.9, *h1:h2* 1:9.5, *f1:h1* 1:1, *f2:h2* 1:4. Genital plate absent. Length ratio of setae *ag1:ag2:ag3* 1.2–1.6:1:1–1.6. Genital setae *g1* and *g2* subequal in length. Pseudanal setae *ps1* 1.8 times longer than *ps2*. Length ratio of setae *g1*:*g2*:*ps1* 1:1:1. *Legs.* Coxal fields I–IV densely punctate. Setae *3c* 1.8–2.5 times longer than *3b*. Fan-like setae *p'* and *p"* with 7–8 tines (Fig. 6). Setae *tc"* 1.6–1.8 times longer than *tc'*. *Lengths of setae*: *vi* 105 (95–105), *ve* 105 (105–120), *si* 135 (105–125), *c2* 145 (130–155), *se* 145 (135–145), *c1* 155 (130–155), *d2* 95 (105–130), *d1* 115 (90–115), *e2* 120 (105–135), *f1* 50 (45–55), *f2* 100 (90–130), *h1* 55 (45–70), *h2* 430 (385), *ag1* 160 (145–170), *ag2* 105 (120–125), *ag3* 165 (120–145), *g1* 60 (50–55), *g2* 50 (55), *ps1* 45 (55), *ps2* 25 (30), *3b* 50 (60), *3c* 125 (105), *4b* 45 (55–60), *4c* 110 (105–115), *tc'* 45 (45–60), *tc"* 70 (75–95), *l'RIII* 60 (55–60), *l'RIV* 45 (45–50).

MALE: Unknown.

Type material. Female holotype and 4 female paratypes from the Wedge-tailed Shearwater *Puffinus pacificus* (Gmelin) (Procellariiformes: Procellariidae) (USNM 632110), JOHNSTON ATOLL, Johnston Island, 6 May, 2002, coll. via US Fish and Wildlife Service; mites sampled by E. Glowska.

Type deposition. Holotype female and 1 female paratype are deposited in the USNM, 3 female paratypes in the Adam Mickiewicz University, Poznan, Poland (AMU).

Etymology. This new species *Stibarokris mariasi* sp. nov. is dedicated to Mr Javier Marías, the King of Redonda (King Xavier) and great Spanish writer.

Differential diagnosis. *Stibarokris mariasi* sp. nov. is most similar to *Stibarokris phoeniconaias* Skoracki and OConnor, 2010 described from the Lesser Flamingo *Phoeniconaias minor* (Geoffroy Saint-Hilaire) from Botswana (Skoracki and OConnor 2010). In females of both species, the hysteronotal shields are entire and not fused to the pygidial shield, the stylophore is constricted posteriorly and punctate, genital setae *g1* and *g2* are subequal in length, coxal fields I–IV are densely punctate and fan-like setae *p'* and *p"* of legs III–IV have similar number of tines (6–8 and 7–8 in *S. phoeniconaias* and *S. mariasi* sp. nov., respectively). *S. mariasi* sp. nov. differs from *S. phoeniconaias* by the longitudinal branch of the peritremes consisting of 11–14 chambers, the length of the movable cheliceral digit (145), the bases of setae *c1* situated distinctly anterior to the level of setae *si*, the propodonotal shield punctate on the whole surface, the hysteronotal shield small, balloon-like, bearing bases of setae *d1* and densely punctate on the whole surface, pseudanal setae *ps1* 1.8 times longer than setae *ps2* (45–55 and 25–30, respectively), setae *h1* and *f1* similar in length (45–70 and 45–55, respectively) and the lengths of setae *ag1* (145–170), *ag2* (105–125) and *ag3* (120–165). In females of *S. phoeniconaias*, the longitudinal branch of the peritremes consists of 15–17 chambers, the movable cheliceral digit is 170 long, setal bases *c1* and *si* are situated at the same transverse level, the propodonotal shield is puncate at the lateral margins, the hysteronotal shield is elliptic, bearing setal bases *d1* and *e2* and punctate at the anterior part, pseudanal setae *ps1* and *ps2* are subequal in the length (20), setae *h1* are twice as long as *f1* (45–55 and 20–30, respectively), the lengths of setae *ag1*, *ag2* and *ag3* are 245–285, 245–270, 330–340, respectively.

Key to the *Stibarokris* species (females)

1. Hysteronotal shield divided longitudinally ..... *S. phalacrus* Kethley, 1970
– Hysteronotal shield entire 2
2. Hysteronotal and pygidial shields fused, fan-like setae *p'* and *p"* of legs III and IV with more than 10 tines 3
– Hysteronotal shield not fused to pygidial shield, fan-like setae *p'* and *p"* of legs III and IV with less than 10 tines 4
3. Setae *h1* about *2.2* times longer than *f1*, lengths of setae *vi*, *ve* and *si* 130–140 … *S. dastychi* Glowska et Skoracki, 2011

– Setae *h1* and *f1* similar in length, lengths of setae *vi*, *ve* and *si* 60–80 .....… *S. langei* Bochkov et Mironov, 1999

4. Longitudinal branch of peritremes with 15–17 chambers, setae *h1* twice as long as *f1*, setae *ps1* and *ps2* subequal in length ….... *S. phoeniconaias* Skoracki et OConnor, 2010
– Longitudinal branch of peritremes with 11–14 chambers, setae *h1* and *f1* subequal in length, setae *ps1* 1.8 times longer than *ps2* …..... *S. mariasi* sp. nov.

Acknowledgments. I am very grateful to the staff of the Department of Vertebrate Zoology, Division of Birds, National Museum of Natural History, Smithsonian Institution, Washington, DC, US (USNM) for making the collection of feathers available for this study.

References

Bochkov A.V., Mironov S.V. 1999. New quill mite species of the family Syringophilidae (Acari: Cheyletoidea) from the European part of Russia. *Acarina*, 7, 35–45

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

Clements J.F., Schulenberg T.S., Iliff M.J., Roberson D., Fredericks T.A., Sullivan B. L., Wood C.L. 2014. The eBird/Clements checklist of birds of the world: Version 6.9. Downloaded from http://www.birds.cornell.edu/clementschecklist/download/ (accessed 1 August 2014)

Glowska E., Chrzanowski M., Kaszewska K. 2015. Checklist of the Quill mites (Acariformes: Syringophilidae) of the World. Zootaxa, 3968, 001–081

Glowska E., Skoracki M. 2011. New species of quill mites (Acari, Cheyletoidea, Syringophilidae) and the first record of male for the genus *Stibarokris*. *Zootaxa*, 2817, 63–68

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 Stigmaeidae. *Archives des Sciences Physiques et Naturelles*, 26, 103–131

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

Skoracki M. 2011. Quill mites (Acari: Syringophilidae) of the Palaearctic region. *Zootaxa*, 2840, 1–414

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

Received: January 17, 2015
Revised: March 30, 2015
Accepted for publication: May 4, 2015