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VERSITA

Notes on quill mites (Acariformes, Syringophilidae) from aquatic birds in North America

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Abstract

A new monobasic genus of parasitic mites, *Phalarophilus fulicarius* gen. nov., sp. nov. (Acariformes, Syringophilidae) is described from feather quills of *Phalaropus fulicarius* (Linnaeus) (Charadriiformes, Scolopacidae) from USA. Females of the new genus differs from those of the genus *Bochkovia* Skoracki et OConnor, by having the rounded posteriorly stylophore, edentate movable cheliceral digits, propodonotal setae arranged 2–1–1–2, thin and smooth dorsal setae of the idiosoma, smooth dorsal setae of legs I and II, and by the presence of setae *vsI*; males are distinguished by the presence of the propodonotal setae arranged 2–1–1–1–1. Additionally, two new syringophilid species recorded from aquatic birds in North America and three new host associations of these mites are recovered.

Keywords

Acari, Syringophilidae, parasites, systematics, water birds, North America

Introduction

Quill mites of the family Syringophilidae (Acariformes, Cheyletoidea) are permanent highly specialised parasites of birds. To date, this family includes more than 200 species in 47 genera. Syringophilids associated with North American passerines have been actively studied in ten passed years (Bochkov and Galloway 2001, 2004; Bochkov *et al*. 2004, 2009; Skoracki *et al*. 2008, 2009, 2010a-c; Skoracki and OConnor 2010). Quill mites from non-passerine birds are still poorly explored in this region (Kethley 1970, 1973; Casto 1977, 1979, 1980a, b). In this paper, we describe a new syringophilid genus and provide three new records of these mites from aquatic birds in North America.

Materials and methods

Mites removed were cleared in lactophenol and mounted in Hoyer's medium. Drawings were made with an Olympus microscope with a camera lucida and DIC optics. In the descriptions below, the idiosomal setation follows Grandjean (1939) as adapted for Prostigmata by Kethley (1990). The leg setation follows Grandjean (1944). These schemes were applied for Syringophilidae by Bochkov *et al*. (2008). All measurements are in µm. The scientific names and classification of birds follow Clements (2007).

All specimens are deposited in the Museum of Zoology, University of Michigan, Ann Arbor, USA (UMMZ). Barry M. OConnor (UMICH) collection numbers are abbreviated as BMOC.

Results

Family: Syringophilidae Lavoipierre, 1953
Subfamily: Syringophilinae Lavoipierre, 1953
Genus: ***Phalarophilus* gen. nov.**
Type species: ***Phalarophilus fulicarius* sp. nov.,** designated here.

Female: Medium-sized syringophilid mites (body length, including gnathosoma, 545–570). Gnathosoma. Hypostomal apex rounded, without protuberances. Stylophore rounded posteriorly. Stylets of movable digits edentate. Peritremes M-shaped with distinct chambers in longitudinal and transverse branches. Idiosoma. Propodonotal shield entire, bearing bases of setae *vi*, *ve*, *si*, *se* and *c1*. Propodonotal setae arranged 2–1–

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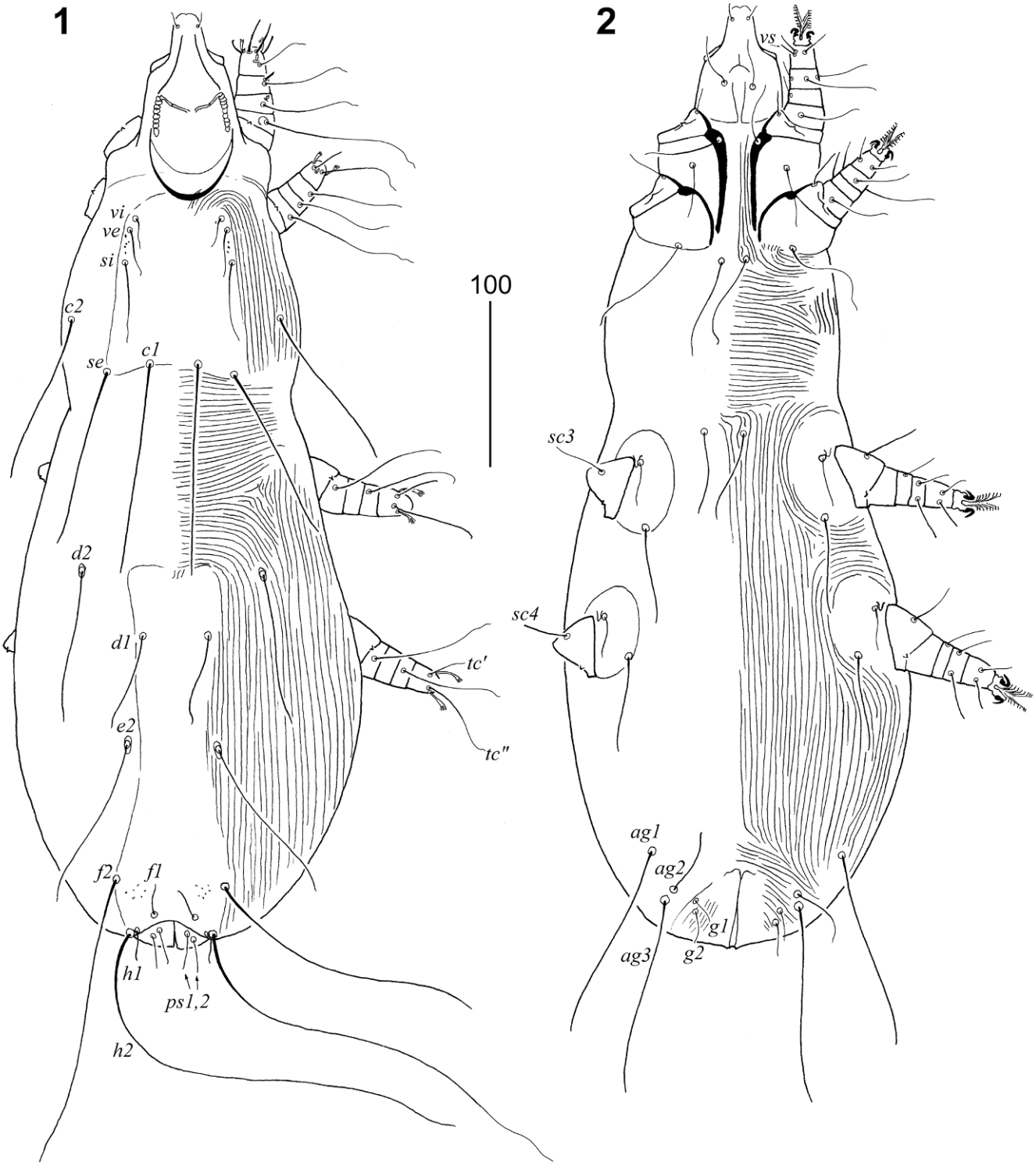
1–2. Hysteronotal and pygidial shields present. Setae *d2* and *e2* long (subequal to *c1*). Setae *d1* situated equidistant between bases of setae *d2* and *e2*. Three pairs of aggenital setae (*ag1-ag3*) present. Genital and pseudanal series with two pairs of setae each. All dorsal setae smooth. Legs. Coxal apodemes I parallel, not fused to apodemes II, coxal apodemes III and IV absent. Claws subequal in size and shape, strongly curved. All setae of legs I and II smooth. Setae *vs* of legs II absent.

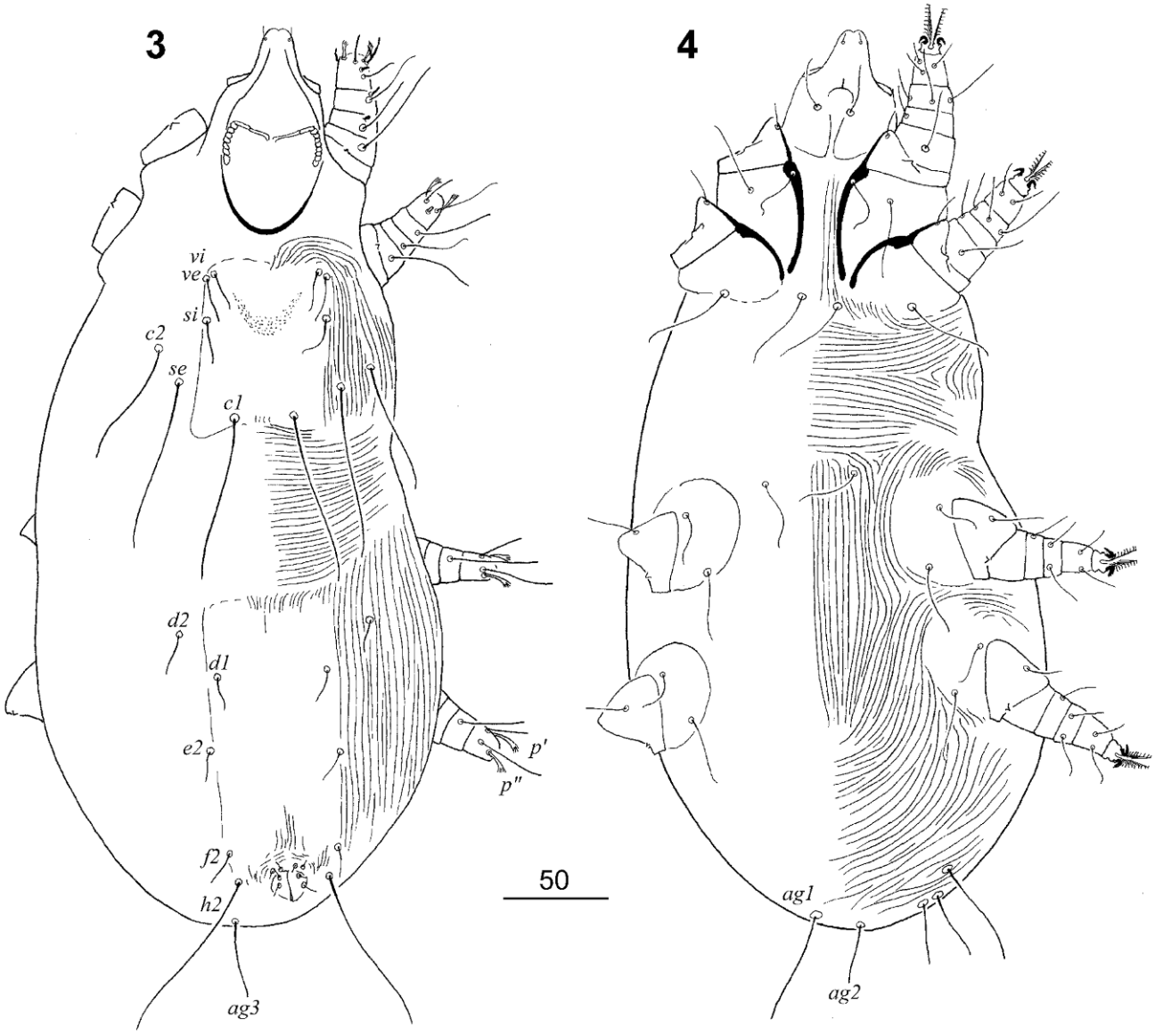


Figs 1 and **2.** *Phalarophilus fulicarius* gen. nov., sp. nov. Female. **1** – in dorsal view; **2** – in ventral view

Male: Characters as in female, except: propodonotal setae arranged 2–1–1–1–1; setae *d2* and *e2* short (distinctly shorter than *c1*). Coxal apodemes I slightly divergent.

Etymology: The name *Phalarophilus* refers the generic name of the host – *Phalaropus* and *philos* (Gr.) – love.

Differential diagnosis: This new genus is morphologically similar to the recently described genus, *Bochkovia* Skoracki et OConnor, 2010. In females of both genera, leg setae *vsII* are absent; the tarsal claws are strongly curved; apodemes of leg I are parallel and not fused to apodemes II; three pairs of the aggenital setae, two pairs of the genital setae, and two pairs of the pseudanal setae are present. This new genus differs from *Bochkovia* by the following features: in females of *Phalarophilus* gen. nov., the stylophore is rounded posteriorly, the movable cheliceral digits are edentate, the propodonotal setae are arranged 2–1–1–2, all dorsal setae of the idiosoma are thin and smooth, the dorsal setae of legs I and II are smooth, setae *vsI* are present; in males, the propodonotal setae are arranged 2–1–1–1–1. In females of *Bochkovia*, the stylophore is constricted posteriorly, the movable cheliceral digits are dentate, each with 2 teeth, the propodonotal setae are arranged 2–2–2; dorsal setae of the idiosoma, excluding terminal setae, are thick and distinctly ornamented, the dorsal setae of legs I and II are knobbed, setae *vsI* are absent; in males, the propodonotal setae are arranged 2–1–1–2.

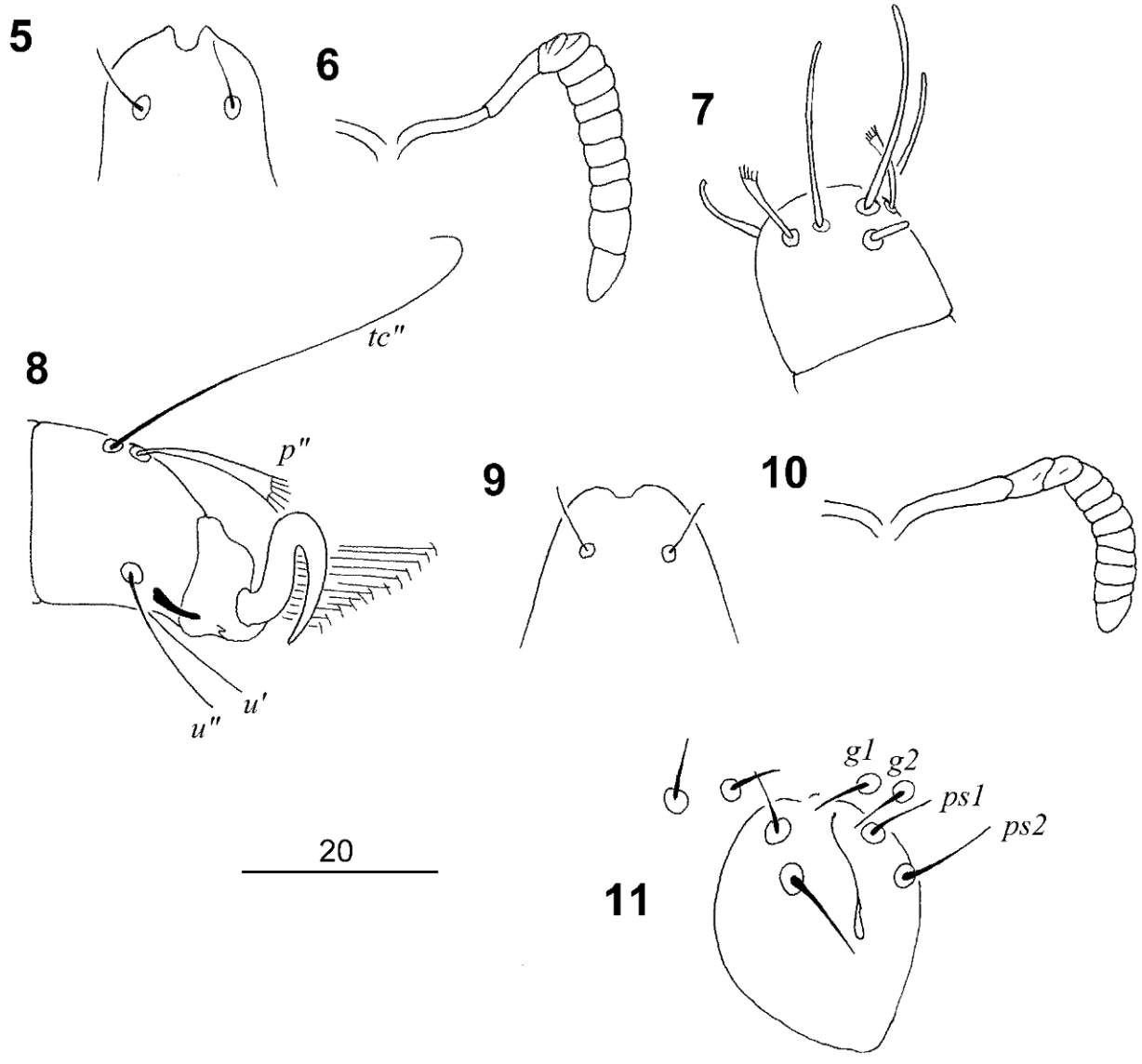


Figs 3 and **4.** *Phalarophilus fulicarius* gen. nov., sp. nov. Male. **3** – in dorsal view; **4** – in ventral view

***Phalarophilus fulicarius* sp. nov.**

Female (holotype): Body length, including gnathosoma, 555 (range for 2 paratypes 545–570). Gnathosoma: Infracapitulum apunctate. Each transverse branch of peritremes with 3 chambers, each longitudinal branch with 8–9 chambers. Length of stylophore 115 (115–130). Idiosoma: Propodonotal shield weakly sclerotized in anterior part, apunctate. Length ratio of setae *vi*:*ve*:*si* 1:1.8:2.5. Setae *se* and *c1* situated at same transverse level. Hysteronotal shield fused to pygidial shield, weakly sclerotized, covered by fine striations, bearing setae *d1*, *f1*, *h1* and *h2*. Setae *f2* situated distinctly anterior to level of setae *f2*. Length ratio of setae *f1*:*f2* and *f2*:*h2* 1:8.5 and 1:1.6, respectively. Pseudanal setae *ps1* and *ps2* subequal in length. Aggenital setae *ag1* and *ag3* subequal in length and 2.2 times longer than *ag2*. All coxal fields apunctate. Legs: Fan-like setae (*p'* and *p"*) of tarsi III and IV with 6–7 tines. Setae *tc"* of tarsi III–IV twice longer than *tc'III–IV*. Lengths of setae: *vi* 20 (15–20), *ve* 35 (30), *si* 50 (40–45), *se* 110 (135), *c1* 130 (110–135), *c2* 110 (105–125), *d1* 65 (55–80), *d2* 95 (90–100), *e2* 100; *f1* 20 (20–25), *f2* 170 (140–165), *h1* 20 (20–25), *h2* 275 (285–290), *ps1* and *ps2* 20 (20), *g1* and *g2* 25 (25), *ag1* 130 (125–130), *ag2* (55–60), *ag3* 130 (135), *tc'III–IV* 25 (25), *tc"III–IV* 50 (50–55), *sc3* and *sc4* 30 (25–30).

Male (4 paratypes): Body length, including gnathosoma, 430–470. Gnathosoma: Infracapitulum apunctate. Each transverse branch of peritremes with 3 chambers, each longitudinal branch with 8–9 chambers. Length of stylophore 105–115. Idiosoma: Propodonotal shield weakly sclerotized in anterior part, with minute punctations in middle area, bearing bases of



Figs 5–11. *Phalarophilus fulicarius* gen. nov., sp. nov. Female (**5–8**): **5**, hypostomal apex; **6**, peritreme; **7**, tarsus of leg I in dorsal view; **8**, tarsus of leg III in lateral view. Male (**9–11**): **9**, hypostomal apex; **10**, peritreme; **11**, genito-anal region

setae *vi*, *ve*, *si* and *d1*. Setae *vi*, *ve* and *si* subequal in length. Setae *se* situated distinctly anterior to level of setae *c1*. Hysteronotal shield fused to pygidial shield, weakly sclerotized in anterior and posterior parts, bearing bases of setae *d1*. Setae *d1*, *d2*, and *e2* subequal in length. Setae *h2* about 4 times longer than *f2*. Length ratio of setae *ag1*:*ag2*:*ag3* 2:1:1.4. All coxal fields apunctate. Legs: Fan-like setae (*p'* and *p"*) of tarsi III and IV with 6–7 tines. Lengths of setae: *vi* 15–20, *ve* 15–20, *si* 20–25, *se* 70–80, *c1* 80–85, *c2* 55, *d1* 20, *d2* 20, *e2* 20, *f2* 20, *h2* 70–85, *ag1* 50–60, *ag2* 25, *ag3* 35.

Type material: Holotype female, 2 female, 4 male, 2 tritonymph, and 1 protonymph paratypes from scapular quills of *Phalaropus fulicarius* (Linnaeus) (Charadriiformes, Scolopacidae) (BMOC 83-0608-006), USA: California, San Diego Co., San Diego, 2–6 December 1982, coll. J.R. Jehl.

Type deposition: All material is deposited in the UMMZ.

Etymology: This name refers the specific name of the host.

***Chenophila kanduli* Bochkov, 1998**

This species was described from *Anas querquedula* Linnaeus, 1758 (Anseriformes, Anatidae) from Russia (Kaliningrad Prov.) (Bochkov and Mironov 1998) and has never been recorded since the original description.

Material examined. One female and 1 male from *Anas clypeata* Linnaeus, 1758 [new host]; USA: Michigan, Monroe Co., Pointe Mouillee State Game Area, 30 April 1982, coll. S. Goodman. All material is deposited in the UMMZ.

***Selenonycha baltoda* Kethley, 1970**

This species was originally described from *Charadrius wilsonia* (Ord, 1814) (Charadriiformes, Charadriidae) from USA (Louisiana) (Kethley 1970). The record of this species from *Charadrius placidus* Gray et Gray, 1863 from Russia (the Far East) (Bochkov and Mironov 1998), actually represents an undescribed species.

Material examined. Four females, 2 males, and 1 tritonymph from *Chlidonias niger* (Linnaeus, 1758) [new host] (Charadriiformes, Laridae) (BMOC #82-0514-011); USA: Michigan, Monroe Co., Pionte Mouillee State, Game Area, 14 May 1982, coll. S. Goodman. All material is deposited in the UMMZ.

***Charadriphilus ralli* Skoracki et Bochkov, 2010**

This species was recently described from *Rallus aquaticus* Linnaeus, 1758 (Gruiformes, Rallidae) from Kazakhstan (Skoracki and Bochkov 2010). The following records are the first since the original description.

Material examined. Three females and 4 males from scapular quills of *Fulica americana* Gmelin, 1789 [new host] (Gruiformes, Rallidae) (BMOC #82-0423-010); USA: Michigan, Monroe Co., Pionte Mouillee State, Game Area, 23 April 1982, coll. S. Goodman. All material is deposited in the UMMZ.

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