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Quill mites associated with columbiform birds (Acari: Syringophilidae)

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ABSTRACT. Two new species of quill mites (Acari: Syringophilidae) are described from doves: *Terratosyringophilus geotrygonus* n. sp. from the lined quail-dove *Geotrygon linearis* from Venezuela and *Castosyringophilus claravis* n. sp. from the blue ground-dove *Claravis pretiosa* from Bolivia. Two bird species: the black-winged ground-dove *Metropelia melanoptera* and the ruddy ground-dove *Columbina talpacoti* are new hosts for *Castosyringophilus mucuya* (CASTO, 1980).

Key words: acarology, taxonomy, Syringophilidae, quill mites, new taxa, ectoparasites, Columbiformes.

INTRODUCTION

The family Syringophilidae is one of the eight families in superfamily Cheyletoidea (Acari: Prostigmata). All species of syringophilid mites are obligatory and permanent ectoparasites of birds. They live and reproduce within the quills of the primaries, secondaries, tail-feathers, coverts and occasionally in body feathers (subfam. Syringophilinae LAVOPIERRE), or only inside body feathers (subfam. Picobiinae JOHNSTON et KETHLEY, except monotypic genus *Calamincola* which representants live in primaries and coverts).

The systematics of quill mites is still not sufficiently understood. Presently, there are about 140 described species grouped in 31 genera belonging to the subfamily Syringophilinae and 21 species grouped in 2 genera in the Subfamily Picobiinae. Mites from the both subfamilies are known from over 180 bird species grouped in 55 families and 18 orders.

The present paper deals with the description of two new species belong to two genera, *Terratosyringophilus* and *Castosyringophilus*: *T. geotrygonus* n. sp. from the lined quail-dove *Geotrygon linearis* (PREVOST) from Venezuela and *C. claravis* n. sp. from quills of the blue ground-dove *Claravis pretiosa* (FERRARI-PEREZ) from Bolivia. Two bird species the black-winged ground-dove *Metropelia melanoptera* (MOLINA) and the ruddy ground-dove *Columbina talpacoti* (TEMMINCK) are new hosts for *Castosyringophilus mucuya* (CASTO, 1980).

MATERIAL 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 polyvinylolactophenol medium and examined with the Nomarsky interference-contrast-phase with an Olymplus BH2 microscope. The nomenclature of idiosomal setae follows FAIN (1979) in the version adapted for the family Syringophilidae (BOCHKOV & 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 & MOORE (1991). All measurements in descriptions are in micrometers (μm). 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 LAVOIPERRE, 1953 **Subfamily Syringophilinae LAVOIPERRE, 1953**

***Terratosyringophilus geotrygonus* n. sp.**

Figs. 1-8

ETYMOLOGY

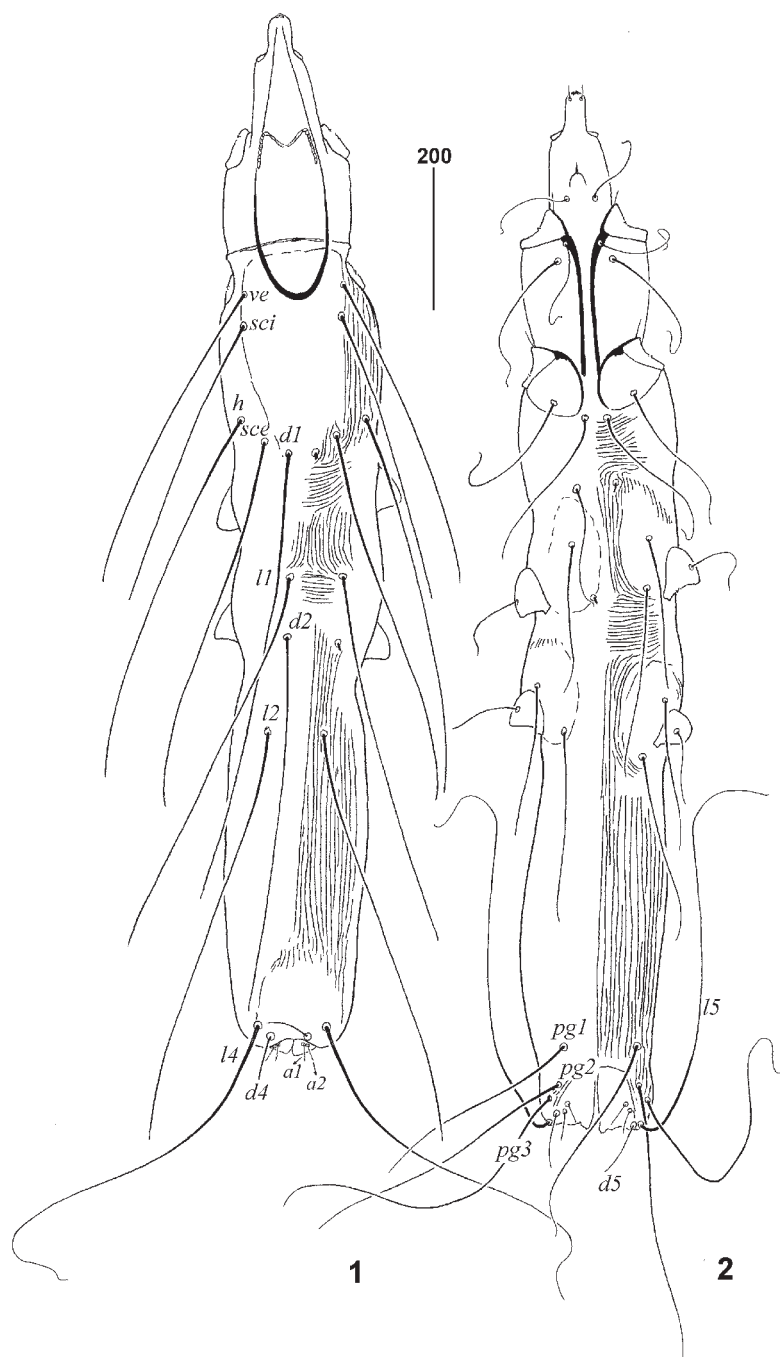
The name *geotrygonus* refers to the generic name of the host.

TYPE MATERIAL

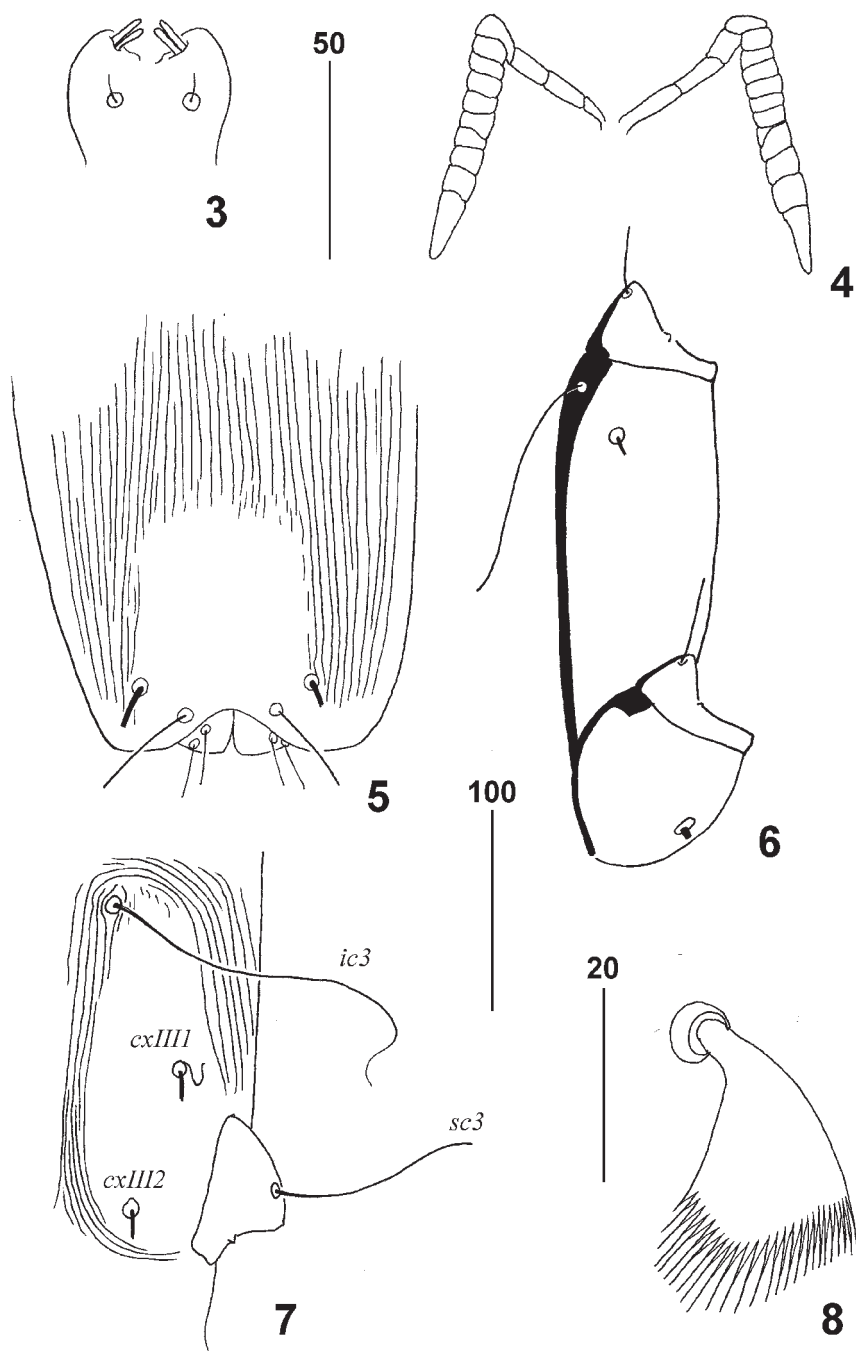
Female holotype and paratypes: 30 females and 11 nymphs (Syr.148) from the lined quail-dove *Geotrygon linearis* (Columbidae); Venezuela, Cumbre de Valencia, 30.12.1911, leg. S. M. KLAGES. The holotype and most of paratypes are deposited at UAM, 2 female paratypes at ZIN and 2 female paratypes at ZSM.

DIFFERENTIAL DIAGNOSIS

Presently, the monotypic genus *Terratosyringophilus* comprises the species *T. pioni* BOCHKOV et PEREZ, 2002 described from the white-crowned parrot *Pionus*



1, 2. *Terratosyringophilus geotrygonus* n. sp., female: 1 - dorsal view; 2 - ventral view



3-8. *Terratosyringophilus geotrygonus* n. sp., female: 3 - hypostomal apex; 4 - peritremes; 5 - opisthosoma, dorsal view; 6 - epimeres I and II; 7 - fan-like seta of legs III; 8 - coxa III

senilis (Psittaciformes: Psittacidae) from Mexico (BOCHKOV & PEREZ 2002). The new species is distinguished from *T. pioni* by the following characters: in the females of *T. geotrygonus* n. sp. the propodosomal shield is weakly developed and margins are invisible, the pygidial shield is well developed, each longitudinal branch of the peritremes has 13-15 chambers, lengths of setae *ve* and *h* are 400-480 and 485-600 respectively, the ratio of distance between setae *l1-d2:d2-l2* is 1:2-3. In the females of *T. pioni* the propodosomal shield is well developed and margins are visible, the pygidial shield is absent, each longitudinal branch of the peritremes has 8-9 chambers, lengths of setae *ve* and *h* are 350 and 450 respectively, the ratio of distance between setae *l1-d2:d2-l2* is 1:1.2.

DESCRIPTION

Female (Figs 1-8). Total body length in holotype 1315 (1305-1465 in ten paratypes). GNATHOSOMA. Hypostomal apex ornamented with two pairs of large and finger-like median protuberances (Fig. 3). Peritremes M-shaped, each transversal branch of peritremes with 3 chambers, each longitudinal branch with 10-12 chambers (Fig. 4). Stylophore, 380 (380-410) long. Chelicerae, (300-310) long. IDIOSOMA. Propodosomal plate weakly sclerotized, margins indistinct, and bearing bases of setae *ve*, *sci* and *d1*. Hysterosomal shield absent, pygidial shield present with indistinct anterior margin (Fig. 5). Cuticular striations as in figs. 1 and 2. LEGS. Coxae I-IV well sclerotized, without punctuation. Coxae III rich bases of setae *ic3* (Fig. 6). Epimeres I fused to epimeres II in mid-part of epimeres II (Fig. 7). Setae *p'* and *p''* multiserrate, each with 26-32 tines (Fig. 8). Setae *tc'III-IV* about twice as long as *tc''III-IV*.

Length of setae: *ve* 395 (395-480); *sci* 285 (270-410); *h* (485-600); *sce* (505-535); *d1* (480-655); *d4* 65 (55-70); *d5* 65 (50-75); *l1* (535-555); *l2* 530 (485-665); *l4* 500 (500-665); *l5* 535 (485-590); *a1* and *a2* 30 (30-35); *g1* 55 (55-60); *g2* 50 (50-55); *sc3* 160 (130-155); *sc4* 95 (100-140); *pg1* (265-365); *pg2* (370-395); *pg3* (365-470); *tc'III-IV* (25); *tc''III-IV* (45); *cxIII1* (190); *cxIII2* (250).

Male unknown.

Castosyringophilus claravis n. sp.

Figs. 9-15

ETYMOLOGY

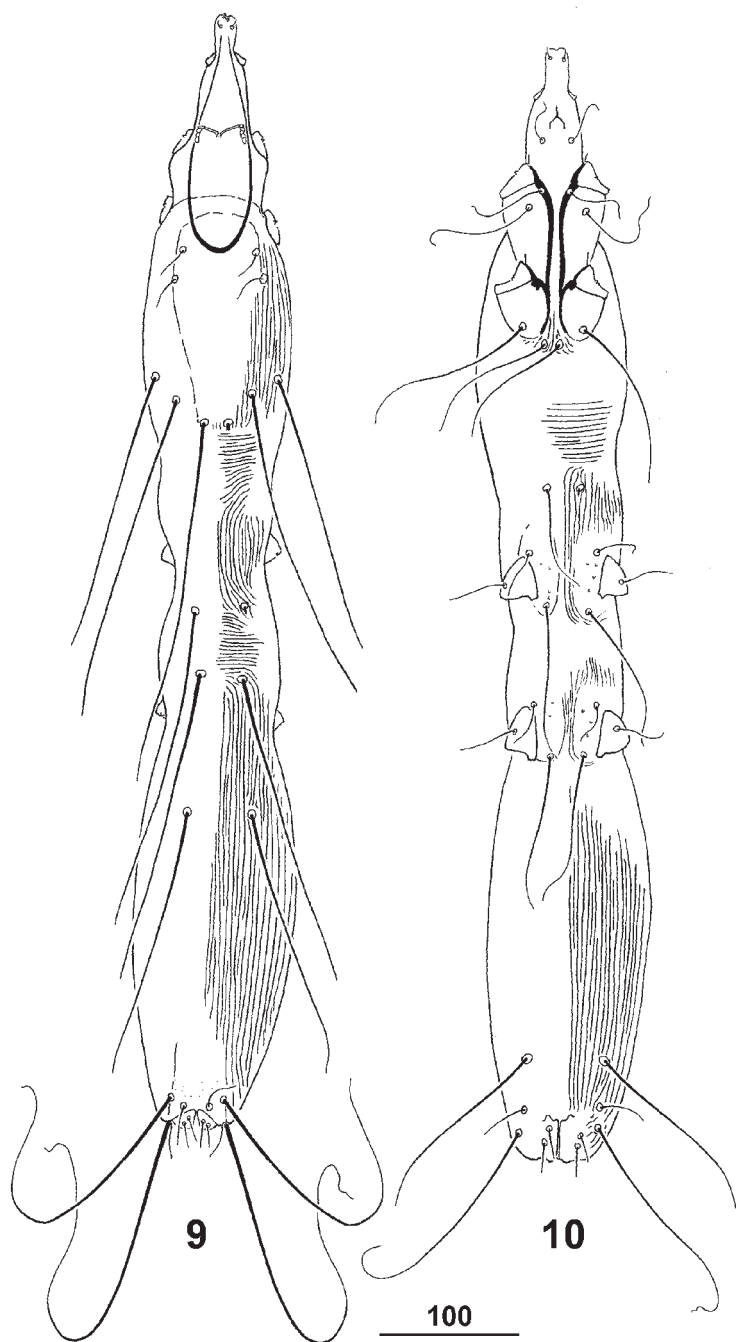
The name *claravis* refers to the generic name of the host.

TYPE MATERIAL

Female holotype and paratypes: 7 females and 9 nymphs (Syr.149) from quills of the blue ground-dove *Claravis pretiosa* (Columbidae); Bolivia, Sierra de Chiquitos, leg. M. KIEFFER. The holotype and most of paratypes are deposited at UAM, 1 female and 1 nymph paratypes at ZIN and 1 female paratype at ZSM.

DIFFERENTIAL DIAGNOSIS

This new species is closely related to *Castosyringophilus forpi* BOCHKOV et PEREZ, 2002 described from the mexican parrotlet *Forpus cyanopygius* (Psittaciformes: Psitta-

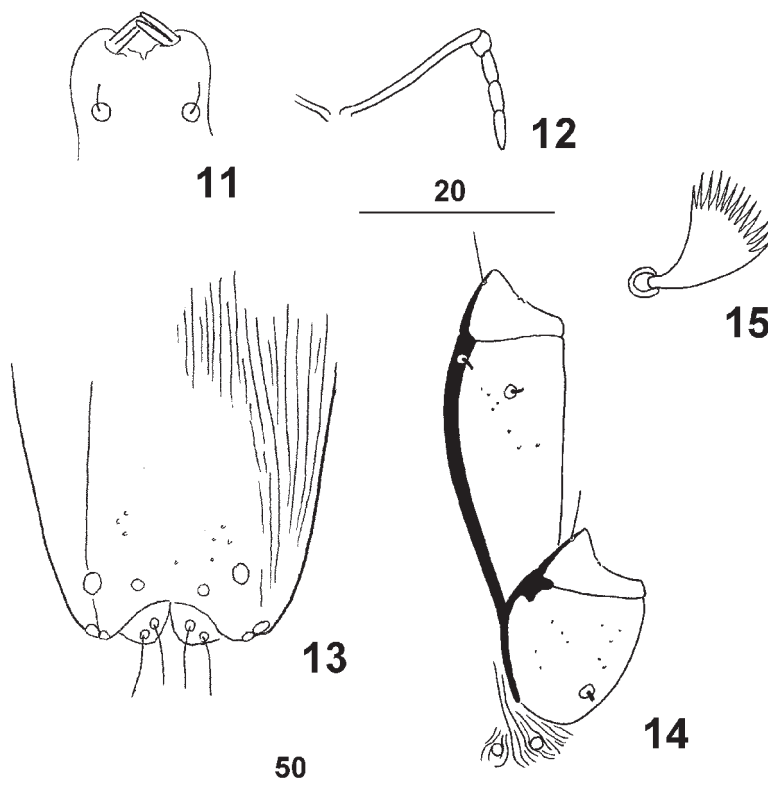


9, 10. *Castosyringophilus claravis* n. sp., female: 9- dorsal view; 10 - ventral view

cidae) from Mexico (BOCHKOV & PEREZ 2002). The new species is distinguished from *C. forpi* by the following characters: in the females of *C. clavaris* n. sp. total body length is 750-805, each longitudinal branch of peritremes has 4 chambers, the length of seta *d1* is 265-275, distance between setae *d2* and *l2* bases is twice as long as between bases of setae *l1* and *d2*. In the females of *C. forpi* total body length is 570-580, each longitudinal branch of peritremes has 6 chambers, the length of seta *d1* is 120, the distance between seta *d2*-*l2* is 1.5 times longer than the distance between *l1*-*d2* bases.

DESCRIPTION

Female (Figs 9-15). Total body length in holotype 805 (730-805 in six paratypes). GNATHOSOMA. Hypostomal apex ornamented, two pairs of large and finger-like protuberances present (Fig. 11). Peritremes M-shaped, each transversal branch with 1 chamber, each longitudinal branch with 4 chambers (Fig. 12). Stylophore, 165 (165) long. IDIOSOMA. Propodosomal shield weakly sclerotized, bearing bases of setae *ve*, *sci* and *d1*. Hysterosomal plate absent. Pygidial shield present, anterior margin invisible, sparsely punctated (Fig. 13). Ratio of distance between setae *l1*-*d2*:*d2*-*l2* 1:2. Cuticular



11-15. *Castosyringophilus clavaris* n. sp., female: 11 - hypostomal apex; 12 - peritrema; 13 - opisthosoma, dorsal view; 14 - epimeres I and II; 15 - fan-like seta of legs III

striations as in Figs. 9 and 10. LEGS. Coxae I and II well sclerotized, III and IV weakly sclerotized with indistinct anterior margin. All coxae sparsely dotted. Epimeres I fused to II in anterior part of epimeres II (Fig. 14). Fan-like setae p' and p'' multiserrate, each with 13-15 tines (Fig. 15). Setae $tc'III-IV$ about twice as long as $tc''III-IV$.

Length of setae: ve 25 (25-35); sci 25 (25-30); h 190 (170-205); sce 225 (200-225); $d1$ (230-260); $l1$ 215 (220-225); $d2$ 200 (205-220); $l2$ 190 (175-195); $d4$ 25 (20-25); $l4$ (230-250); $d5$ 25 (25); $l5$ 315 (305-415); $a1$ and $a2$ 15 (15-20); $g1$ and $g2$ 15 (15-20); $sc3$ 30 (30-40); $sc4$ 25 (20-35); $pg1$ 135 (125); $pg2$ 30 (30-45); $pg3$ 155 (150-170); $tc'III$ 25 (20-25); $tc''III$ 45 (40-45); $cxIII1$ 25 (25); $cxIII2$ 100 (100-120).

Male unknown.

Castosyringophilus mucuya (CASTO, 1980)

This species was known only from the type host, the common ground-dove *Columbina passerina* (Columbidae) from USA (CASTO 1980). Below we give two additional hosts for this species.

Material examined: 11 females and 4 nymphs from the black-winged ground-dove *Metropelia melanoptera*; Argentina, Rio Negro, 10.12.1938, leg. E. SCHUHMACHER. Whole material is deposited at UAM except 2 females at ZSM and 2 females at ZIN.

Six females, 2 males and 3 nymphs from the ruddy ground-dove *Columbina talpacoti*; Brasil, Bahia, 1903. Whole material is deposited at UAM except 1 female at ZSM and 1 female at ZIN.

DISCUSSION

The host order Columbiformes consists of the widespread and successful doves and pigeons grouped in family Columbidae (42 genera, and over 300 species) and the extinct species classified in the family Raphidae. Syringophilid mites are known to parasitize twelve columbid species (Table. 1) belonging to the eight genera *Columba*, *Zenaida*, *Turtur*, *Streptopelia*, *Columbina*, *Metropelia*, *Geotrygon* and *Claravis*.

From the four genera of quill mites parasitizing doves: *Peristerophila*, *Castosyringophilus*, *Terratosyringophilus* (subfam. Syringophilinae) and *Picobia* (subfam. Picobiinae). Only the first one is specific to this host order.

The genus *Peristerophila* includes three species: *P. columba* found only on type host - *Columba livia*, *P. zenadoura* specific on a host of the genus *Zenaida* but also noted on *Columba livia* and *P. tympanistria* restricted to *Turtur tympanistria*. It is noteworthy that one species of this genus - *P. columba* was also noted on the red-tailed hawk *Buteo jamaicensis* (Falconiformes: Accipitridae) (CASTO 1976). Presence of this quill mite species may be a result of host switching between birds whilst red-tailed hawk was feeding. The diet of red-tailed hawks consists mainly of rodents and reptiles, but also birds which make up the rest of the diet (PRESTON & BEANE 1993).

The next two closely related genera - *Castosyringophilus* and *Terratosyringophilus* inhabit doves as well as parrots (BOCHKOV & PEREZ 2002; present paper) e.g. representatives of *Castosyringophilus* inhabit doves from genera *Columbina* and *Metropelia*

and are also to be found on parrots – *Forpus cyanopygius*. Similarly, representants of *Terratosyringophilus* parasitizing columbid birds of the genera *Zenaida* and *Clara-vis* were also reported from parrots of the genus *Pionus*. The presence of these quill mite genera on both doves and on parrots indicates that these two orders of birds are phylogenetically closely related (SIBLEY *et al.* 1988), and suggests that the ancestors of these two genera of quill mites occupied the common ancestor of Psittaciformes-Columbiformes (BOCHKOV & PEREZ 2002).

The taxa of the last genus – *Picobia* are found on doves as well as on five other orders of birds: Passeriformes, Galliformes, Psittaciformes, Upupiformes and Piciformes (SKORACKI *et al.* 2004). This broad spectrum of hosts is probably a result of stable life conditions in the quills of body feathers and which are quite similar in birds belonging to different orders. This suggests that we can not expect phylogenetic congruence between picobian mites and their host species (SKORACKI *et al.* 2004).

Table. 1. A list of syringophilid mites parasitizing columbiform birds; **p.p.** - present paper.

Quill mite species	Host species	Distribution	References
<i>Peristerophila columba</i> (HIRST)	<i>Columba livia</i> GMELIN	USA	KETHLEY 1970
<i>P. zenadoura</i> (CLARK)	<i>Columba livia</i> GMELIN	USA, N. Africa	BOCHKOV & MIRONOV 1998; CASTO 1976
	<i>Zenaida asiatica</i> (L.)	USA	CASTO 1976
	<i>Zenaida auriculata</i> (DES MURS)	Argentina	SKORACKI & SIKORA 2002
	<i>Zenaida macroura</i> (L.)	USA	CLARK 1964
<i>P. tympanistria</i> SKORACKI et DABERT	<i>Turtur tympanistria</i> (TEMM.)	Togo	SKORACKI & DABERT 2002
<i>Picobia khushalkhani</i> (KIVGANOV et SHARAFAT)	<i>Columba livia</i> GMELIN	Afghanistan	KIVGANOV & SHARAFAT 1995
<i>P. zumpti</i> (LAWRENCE)	<i>Streptopelia capicola</i> (SUND.)	S. Africa	LAWRENCE 1959
	<i>Streptopelia senegalensis</i> (L.)	S. Africa	SKORACKI & DABERT 2002
<i>Castosyringophilus mucuya</i> (CASTO)	<i>Columbina passerina</i> (L.)	USA	CASTO 1980
	<i>Columbina talpacoti</i> (TEMM.)	Brasil	p.p.
	<i>Metropelia melanoptera</i> (MOLINA)	Argentina	p.p.
<i>C. claravis</i> n. sp.	<i>Claravis pretiosa</i> (FERRARI-PEREZ)	Bolivia	p.p.
<i>Terratosyringophilus longisoma</i> (CASTO)	<i>Zenaida asiatica</i> (L.)	USA	CASTO 1979
	<i>Zenaida macroura</i> (L.)	USA	CASTO 1979
<i>T. geotrygonus</i> n. sp.	<i>Geotrygon linearis</i> (PREVOST)	Venezuela	p.p.

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