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# First record of *Picobia zumpti* (Acari: Syringophilidae) from quills of the rock pigeon in North America and description of the male

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**Abstract**

A quill-dwelling mite, *Picobia zumpti* (LAWRENCE, 1959) (Acari: Syringophilidae) known previously only from the doves *Streptopelia capicola* (SUNDEVALL) and *S. senegalensis* (L.) (Columbiformes: Columbidae) in South Africa has been unexpectedly recorded from rock pigeons *Columba livia* GMELIN (Columbidae) in the United States of America. Females of this species are redescribed and the male is described for the first time. An unpaired seta *it"* overlooked by other researchers was observed on tarsi I and II in this and other *Picobia* species.

**Keywords**: quill mites, Syringophilidae, rock pigeon, mites, parasites, systematics.

## Introduction

Mites of the family Syringophilidae LAVOIPIERRE, 1953 (Acari: Acariformes) are permanent parasites of birds, and dwell inside the feather quills of their hosts (KETHLEY, 1970). Until now, only 32 species of this potentially species-rich family have been recorded in North America (KETHLEY, 1970, 1973; BOCHKOV & GALLOWAY, 2001, 2004). While studying parasites of the rock pigeon *Columba livia* GMELIN (Columbidae) from Illinois, we identified *Picobia zumpti* (LAWRENCE, 1959) (Acari: Syringophilidae), a new species for the North American fauna and a new host record for this mite. Herein we describe these specimens from the rock pigeon; the male of this species is described for the first time.

## Material and methods

Rock pigeons were initially collected by DALE CLAYTON and BRETT MOYER (University of Utah, USA) in 1999 as part of a long-term study on the ecology of pigeons and their lice. Birds were killed and washed in a commercial paint-shaker in a 3.8 L paint can containing a 1.0% solution of dishwashing liquid. Mites were removed and mounted in commercially available PVA medium (BioQuip Products, Inc.).

Drawings of *P. zumpti* were made using a phase-contrast Zeiss microscope fitted with a camera lucida. In the description below, the idiosomal chaetotaxy follows KETHLEY (1970) as interpreted by BOCHKOV & MIRONOV (1998). The leg chaetotaxy follows GRANDJEAN (1944). All measurements are given in micrometres (μm). Where mention is made of distances between levels of setae, this refers to distance between transverse levels of sets of setal pairs (e.g., in Fig. 1b, the distance between levels of *l1* and *d2* is greater than that between *d2* and *l2*). The majority of this material is housed in the Strickland Museum of Entomology (Acarology Collection) at the University of Alberta, except for three females and one male deposited in the Zoological Institute, Russian Academy of Sciences, Saint-Petersburg, Russia.

## Systematics

### Family Syringophilidae LAVOIPIERRE, 1953

### Subfamily Picobiinae JOHNSTON & KETHLEY, 1973

### Genus *Picobia* HALLER, 1878

The genus *Picobia* HALLER, 1878 includes 20 named species parasitizing quills of body feathers. These mites are known from neognathous birds of six orders, namely Columbiformes, Galliformes, Passeriformes, Piciformes, Psittaciformes, and Upupiformes (SKORACKI *et al.*, 2004; SKORACKI & HEBDA, 2004). The revision of this genus has been recently published by SKORACKI *et al.* (2004). It is important to note that an unpaired seta *it"* of tarsus I, situated between bases of setae *p"*I and *a"*I (Fig. 2F), has been overlooked in all 20 species of the genus *Picobia* by researchers up to now (KETHLEY, 1970; FAIN *et al.*, 2000; SKORACKI *et al.*, 2004). We were able to check this character in most recognized species of the genus and always observed this seta. The seta of tarsus II considered as *a"*II by KETHLEY (1970) and as *p"*II by SKORACKI *et al.* (2004) is also an iteral one, *it"*II (Fig. 2H). The true nature of this seta is obvious from its position and very characteristic leaf-like shape, which are the same as in *it"*I.

### *Picobia zumpti* (LAWRENCE, 1959)
(Figs. 1-3)

*Syringophilus zumpti* LAWRENCE, 1959: 425, fig. 5
*Picobia zumpti*, KETHLEY, 1970: 65, fig. 37; SKORACKI & DABERT, 2002: 144; SKORACKI *et al.*, 2004: 171.

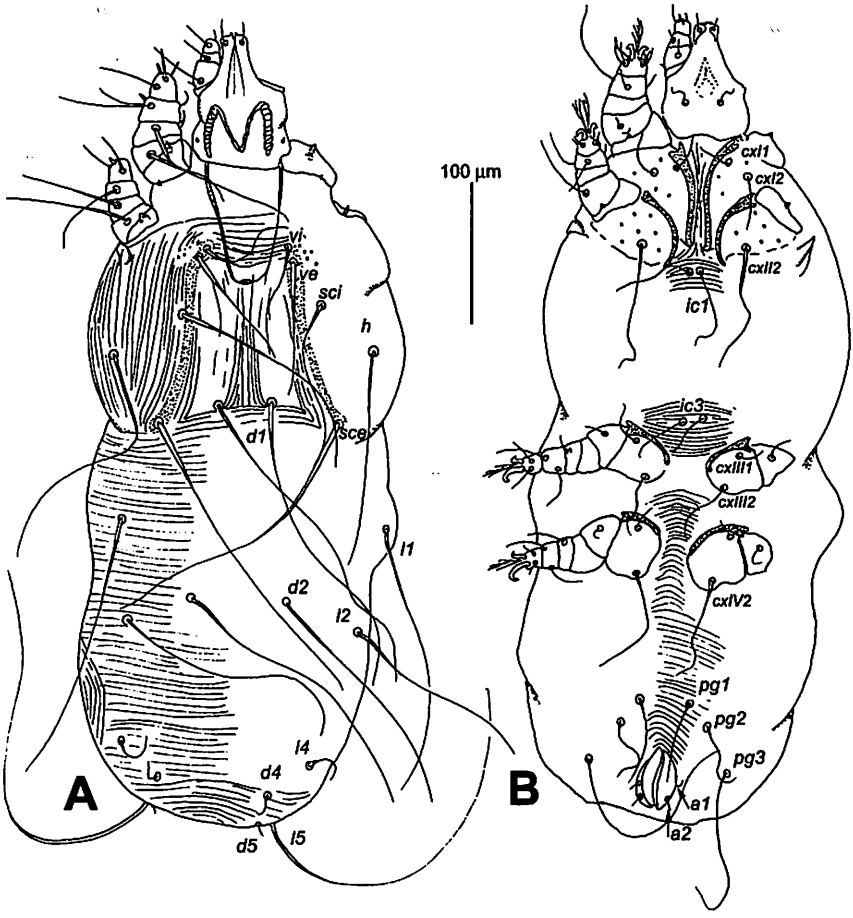


Fig. 1. *Picobia zumpti* (LAWRENCE, 1959), female. A: dorsal view; B: ventral view.

*Female* (9 specimens): Total length, including gnathosoma, 560-665 (Fig. 1). *Gnathosoma.* Hypostomal apex truncate (Fig. 2A). Peritremes M-shaped, transverse branch with 2-3 chambers, longitudinal branch with 10-11 chambers (Fig.2B). Stylophore rounded posteriorly, 200-210 long. *Idiosoma.* Propodonotal plate punctate, divided into one median fragment bearing setae *d1* and two lateral fragments bearing setae *vi, ve,* and *sce,* setae *sci* situated on or off propodonotal plate. Seta *vi* bases situated anterior at the level of seta *ve* bases. Setae *vi* about half the length of *ve*. Setae *vi* and *ve* faintly knobbed. Seta *dl* bases situated slightly anterior to the level of seta *sce* bases. Hysteronotal plate absent. Seta *d2* bases situated closer to seta *12* bases than to seta *11* bases. Distance between seta *11* and *d2* levels more than 2 times longer

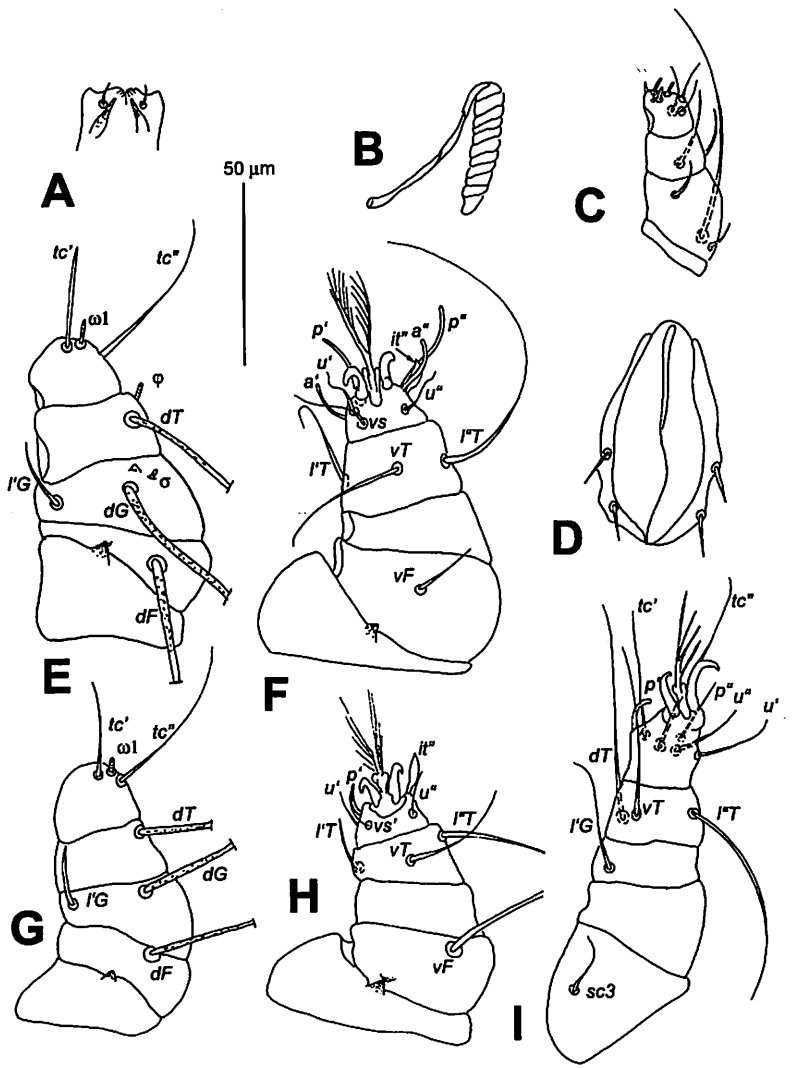


Fig. 2. *Picobia zumpti* (LAWRENCE, 1959), details of female. A: hypostome, ventral view; B: peritreme; C: palp, ventral view; D: vulva; E: leg I, dorsal view; F: leg I, ventral view; G: leg II, dorsal view; H: leg II, ventral view; I: leg III, ventral view.

than distance between seta *d2* and *l2* levels. Pygidial plate absent. Setae *d5* short, about 30 times shorter than *l5*. Paragenital setae *pg2* subequal in length to *pg1* and about 3 times shorter than *pg3*. Two pairs of anal setae present. Opisthosomal lobes not developed. Genital setae absent. *Legs.* Coxae of legs I-II well sclerotized, III and IV weakly sclerotized. Dorsal setae of legs I and II

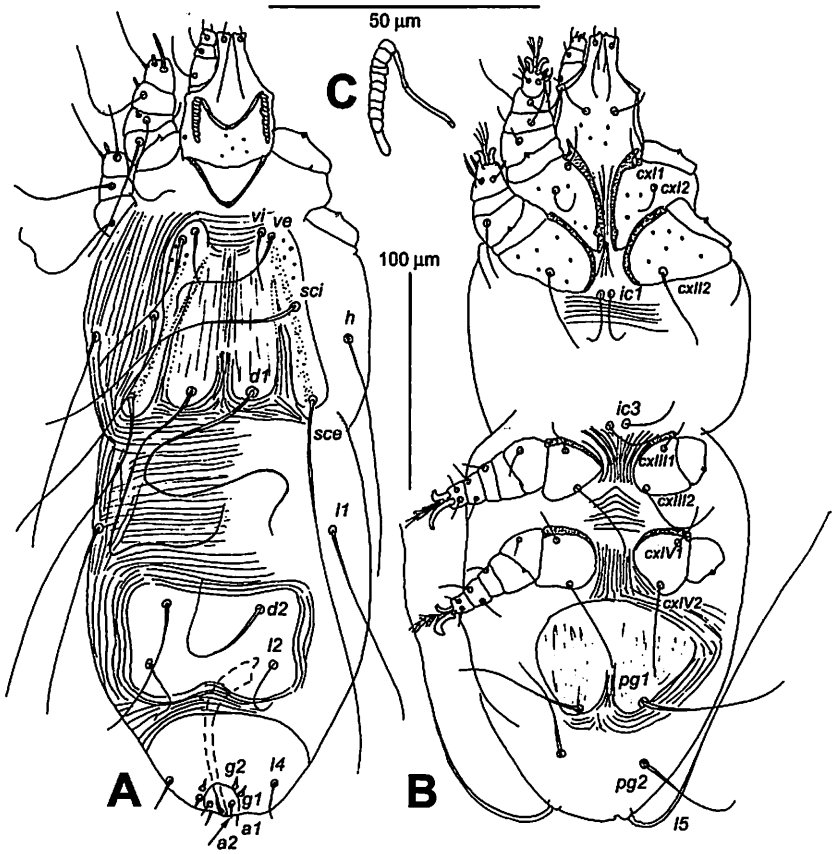


Fig. 3. *Picobia zumpti* (LAWRENCE, 1959), male. A: dorsal view; B: ventral view.

indistinctly knobbed. Antaxial members of claw pairs III-IV distinctly shorter than paraxial members (Fig. 2I). Setae *tc*"III-IV 1.3 times longer than *tc*'III-IV. Setae *cxIII2* almost 2 times shorter than *cxIV2*, all coxal setae nude. Length of setae: *vi* 63-78, *ve* 140-155, *sci* 240-250, *sce* 270-320, *h* 240-295, *l1* 215-260, *l2* 210-240, *l4* 25-40, *l5* 315-470, *dl* 315-360, *d2* 230-270, *d4* 10-17, *d5* 10-13, *ic1* 55-85, *ic3* 60-90, *a1-2* 8-13, *sc3* 15-18, *sc4* 11-15, *pgl* 55-85, *pg2* 60-85, *pg3* 175-210.

*Male* (1 specimen). Total body length, including gnathosoma 380 (Fig. 3). *Gnathosoma.* Hypostomal apex truncate. Peritremes M-shaped, transverse branch of peritremes with 2-3 chambers, longitudinal branch with 10-11 chambers. Stylophore constricted posteriorly, 80 long. *Idiosoma.* Propodonotal

plate punctate and divided longitudinally, bearing setae *vi, ve, sce,* and *dl,* setae *sci* situated on or off propodonotal plate. Length of propodonotal plate 80. Ratio of setae *vi: ve : sci* 1:3:4. Setae *vi* and *ve* slightly knobbed. Seta *vi* bases situated slightly anterior to *ve.* Seta *dl* bases situated slightly anterior to the level of seta *sce* bases. Hysteronotal plate present, weakly sclerotized, bearing setae *d2* and *12.* Setae *11* about 2 times longer than *d2* and 4 times longer than *12.* Pygidial plate weakly sclerotized and punctate, bearing setae *d5* and *15.* Length ratio of setae *d5 :15* 1 : 6.4. A large opisthogastric plate present, separated medially, bearing setae *pgl.* Seta *ic1* bases close to each other but not touching. Setae *pgl* 1.2 times longer than *pg2.* Aedeagus 75 long. *Legs.* Coxae I-II well sclerotized and punctate. Claws of legs III-IV as in females. Dorsal setae of legs I and II indistinctly knobbed. Setae *cxIII2* and *cxIV2* subequal. All setae of coxae III and IV smooth. Lengths of setae: *vi* 27, *ve* 73, *sci* 105, *sce* 160, *h* 145, *11* 115, *12* 27, *15* 225, *dl* 135, *d2* 55, *d5* 18, *ic1* 30, *ic3* 35, *sc3* and *sc4* about 11, *pgl* 60, *pg2* 50.

**Material examined**: One male and 9 females from *Columba livia* GMELIN (Columbiformes: Columbidae) from pigeon numbers 801, 807, 810, 812, 819, 859, 876 (codes of CLAYTON and MOYER), **UNITED STATES OF AMERICA**: near Paxton, Ford County, Illinois, 40°46'N, 88°9' W, VII. 1999, coll. D. CLAYTON and B. MOYER.

**Distribution**: This species was described by LAWRENCE (1959) based on a single female from the ring-necked dove *Streptopelia capicola* (SUNDEVALL) (Columbiformes: Columbidae) in South Africa. Subsequently, SKORACKI & DABERT (2002) recorded a female of *P. zumpti* from the laughing dove *Streptopelia senegalensis* (L.) from the same country. The rock pigeon is a host for another species of the genus *Picobia, P. khushakhani* (KIVGANOV et SHARAFAT, 1995) described from Afghanistan (KIVGANOV & SHARAFAT, 1995), whereas *P. zumpti* has been previously recorded only from two doves of the genus *Streptopelia* BONAPARTE listed above. Therefore, our record of this species on *Columba livia* in North America is unexpected. We suggest that transfer of *P. zumpti* took place either in aviary situations where Eurasian collared-doves *Streptopelia decaocto* (FRIVALDSZKY) (domestic form '*risoria*') and domestic *C. livia* shared lodgings, or between the recently invading wild form of *S. decaocto* and feral *C. livia* (SMITH, 1987; The Illinois Ornithological Society, 2005). This remains highly speculative, as *S. decaocto* has not yet been shown to be a host for *P. zumpti.* Another possibility based on the phylogenetic proximity of *Streptopelia* and old-world *Columba* (JOHNSON *et al.*, 2001) is that *P. zumpti* was present on the common ancestor of these two lineages and has been retained in some of its descendents. In this case, the absence of *P. zumpti* records from all previous studies of mites of *C. livia* may reflect a patchy distribution of this syringophilid species.

**Remarks/Diagnosis**: *Picobia* spp. males are unknown for 11 of 19 currently known species, and therefore species differentiations are completely based on female characters. The female of *P. zumpti* clearly differs from females of other species in the genus *Picobia* by the following combination of characters:

setae *vi* situated slightly anterior to setae *ve*; setae *d5* are shorter than *d4*, anal setae are present; the genital lobes and genital setae are absent; antiaxial and paraxial member of claw pair III-IV are unequal.

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