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NOTES ON SYSTEMATICS OF THE FEATHER MITE GENUS *TROUESSARTIA* CANESTRINI, 1899 (ACARIFORMES: TROUESSARTIIDAE) WITH AN UPDATED WORLD CHECKLIST

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ABSTRACT: The paper provides major references to *Trouessartia* species described since Santana's (1976) world revision of this genus, unified diagnoses of 11 currently recognized species groups (*africana, appendiculata, capensis, crucifera, estrildae, minutipes, picumni, rosterii, stelgidopteryx, tenuipilata* and *viduae*), and a world checklist of currently known species. The updated checklist includes 147 valid species and is supplemented with data on type hosts, distribution and references to most useful descriptions.

KEY WORDS: *Trouessartia*, morphology, species group, diagnoses, checklist

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INTRODUCTION

The feather mite genus *Trouessartia* Canestrini, 1899 with nearly 150 species described is the most species-rich in the family and the second-most among all feather mites (Orwig 1968; Santana 1976; Gaud and Atyeo 1986, 1987; Mironov and González-Acuña 2013; Hernandes 2014, 2017, 2022; Hernandes and Valim 2015; Mironov and Bermúdez 2017; Constantinescu *et al*. 2018a; Mironov and Galloway 2019; Mironov and Chandler 2020). In their overall appearance, the mites of this genus are typical inhabitant of large flight feathers (remiges and rectrices), and they are characterized by a strongly flattened body; extensive and heavily sclerotized dorsal shields; most body setae, except four pairs of macrosetae, being strongly reduced in size; and all legs having large sucker-like pretarsi (Mironov 1987; Dabert and Mironov 1999). However, in contrast to all other feather mite families that specialize in inhabiting the flight feathers with large vanes and occupy corridors on their ventral side, the adults of most *Trouessartia* species, especially large-sized ones, occupy the dorsal surfaces of vanes, where corridors are absent. In this microhabitat, these mites are usually arranged in dense groups, frequently contacting with each other. The preimaginal stages of trouessartiids mainly occupy the vanes of the secondary coverts and the distal parts of the body covert feathers (Mironov 1987; Mironov and González-Acuña 2013; Hernandes and Valim 2015; Mironov and Galloway 2019).

Representatives of the genus *Trouessartia* are predominately distributed on passerines (Passeriformes), and most species are highly host specific (Santana 1976; Gaud and Atyeo 1996). The well-documented and reliable host associations outside passerines are known for one *Trouessartia* species from African barbets (Piciformes: Lybiidae) and for two species from woodpeckers (Piciformes: Picidae) (Gaud 1993; Hernandes 2014; Mironov and Bermúdez 2017). Other one-time records of *Trouessartia* species from single avian species of the families Chionididae (Charadriiformes), Heliornithidae (Gruiformes) and Psittacidae (Psittaciformes), which were based on materials collected from museum dry skins, seem to be the results of accidental contaminations, which happened in the process of collecting.

The genus *Trouessartia* was first recognized in the end of the 19th century (Canestrini 1886; Canestrini and Kramer 1899). Its modern taxonomic borders have been outlined by Orwig (1968) in the generic revision of the subfamily Trouessartiinae. Santana's (1976) world revision of the genus *Trouessartia* was a milestone in the taxonomic and faunistical studies of this genus. In this fundamental work, he provided uniform redescriptions of 70 species (almost all valid species of the genus known at the time) and a key to them. Santana was not able to examine only *T. fulicae* Berla, 1962, which he classified as a *species inquerendum*, and one species described by Mauri and De Alzuet (1968). The aforementioned monograph, published nearly fifty years ago, is still the main manual and key-book on the systematics of the genus.

Over the subsequent five decades that followed Santana's (1976) revision, the number of known *Trouessartia* species has doubled. In particular, 76 new species have been described from various parts of the world (Černý and Lukoschus 1975; Gaud 1977, 1993; Černý 1979; Mironov 1983, 2021a, b; Gaud and Atyeo 1986, 1987; Mironov and Kopij 1996, 2000; Mironov and Galloway 2002, 2019; OConnor *et al*. 2005; Carleton and Proctor 2010; Burdejnaja and Kivganov 2011, Constantinescu *et al*. 2013, 2016a, 2016b, 2018a, b, 2021; Mironov and González-Acuña 2013; Hernandes 2014, 2017, 2022; Hernandes and Valim 2015; Mironov and Overstreet 2016; Mironov and Palma 2016; Hernandes and OConnor 2017; Mironov *et al*. 2021; Hernandes *et al*. 2022; Mironov and Zabashta 2022). It is worth noting that the most extensive investigations of the genus *Trouessartia* started in the beginning of the 21st century: over the past two decades, 25 publications describing 68 new species have been released. Such extensive study of these mites is apparently caused by several reasons. The genus *Trouessartia* is one of the most species-rich and common taxonomic groups of feather mites occurring on passerines. In turn, passerines are the most numerous order of birds distributed worldwide. Additionally, these mites, because of their location in the plumage, are easily detected on their hosts even by the naked eye (Mironov and González-Acuña 2013). It is estimated that the extant world fauna of the genus could comprise over 500 species (Santana 1976; Hernandes and Valim 2015). This estimation seems rather modest, taking into account the very high host specificity of most currently known *Trouessartia* species and a great number of passerine hosts, from which undetermined (and apparently undescribed) species of this genus have been recorded (Atyeo 1973; Hernandes 2022).

In his revision of the genus, Santana (1976) has arranged about half of *Trouessartia* species (31 species) into five supposedly natural species groups. Subsequent researchers have established six more species groups (Gaud and Atyeo 1986; Mironov and Kopij 2000; Mironov and Bermúdez 2017; Mironov and Galloway 2019; Mironov and Chandler 2020). Each group is characterized by a unique combination of morphological features. However, the sets of characters used for given groups are not uniform. The "natural" status of most groups is also supported by their restriction to one or several closely related bird families.

Regarding species identity, the genus *Trouessartia* can be considered one of the best-studied taxa of feather mites associated with passerines. In contrast, phylogenetic relationships within the genus remain almost unexplored. The relationships between small numbers of species—mainly from a few species groups of European passerines—were recently analyzed based on molecular data (Doña *et al*. 2015, 2017; Constantinescu *et al*. 2018b).

The main goals of the present work are to provide uniform diagnoses for the species groups recognized within the genus *Trouessartia* and to present an updated world checklist of currently known valid species. Remarks on some morphological terms used in the descriptions of *Trouessartia* species are also given.

MATERIALS AND METHODS

Feather mites of the genus *Trouessartia* (mites on microscope slides) examined in the present study are deposited in of Acari fund collection of the Zoological Institute of the Russian Academy of Sciences (Saint Petersburg, Russia).

In the diagnoses of the *Trouessartia* species groups, the specific morphological terms (Figs. 1, 2) follow Orwig (1968) and Santana (1976), with a few exceptions. The male genital structure follows Gaud and Atyeo (1986, 1987) (Fig. 3), the idiosomal chaetotaxy follows Griffiths *et al*. (1990) and Norton (1998), and the leg chaetotaxy follows Grandjean (1939).

The scientific names of avian hosts and their supraspecific classification follow Gill *et al*. (2022).

SYSTEMATICS

Family Trouessartiidae Gaud, 1957

Genus ***Trouessartia*** **Canestrini, 1899**

Pterocolus Haller 1878: 538 (nom. nudum), 1882: 51 (nom. preocc.); Canestrini 1886: 296.

Proctophyllodes (*Pterocolus*) Trouessart 1885: 70, 1887: 136; Poppe 1888: 209.

Trouessartia Canestrini in Canestrini and Kramer 1899: 119; Trouessart 1899: 34; Oudemans 1897: 266, 1905: 236, 1908: 54; Vitzthum 1929: 94; Gaud 1952: 93, 1953: 195; 1957: 127; Till 1954: 187; Gaud and Petitot 1948a: 43, 1948b: 342; Gaud and Mouchet 1957: 494, 1958: 36; Gaud and Till 1961: 239; Orwig 1968: 23; Atyeo and Peterson 1972: 56; Santana 1976: 10; Gaud and Atyeo 1986: 263, 1987: 367; Mironov 1983: 361; Mironov and González-Acuña 2013: 123; Hernandes 2014: 50; Mironov and Galloway 2019: 4; Mironov and Chandler 2020: 4; Constantinescu *et al*. 2021: 156.

Type species: *Dermaleichus corvinus* Koch, 1841, by subsequent designation (Oudemans 1897).

A detailed diagnosis of the genus *Trouessartia*, and almost exhaustive description of the external morphological structures used in its systematics, as well as the modern standard of the species descriptions were all provided by Santana (1976). The analysis of the components constituting the genital apparatus of *Trouessartia* males, with examples of the species groups restricted to swallows (Hirundinidae), was carried out by Gaud and Atyeo (1986, 1987). An expanded set of characters and measurements for species descriptions was proposed by Mironov and González-Acuña (2013), and the measuring techniques were described by Mironov and Galloway (2019) and Mironov and Chandler (2020). In addition to a key to all *Trouessartia* species considered in the Santana's (1976) world revision, keys to species of particular groups, *appendiculata*, *capensis*, *minutipes* and *stelgidopteryx*, have been published in the past four decades (Gaud and Atyeo 1986, 1987; Mironov and Galloway 2019; Mironov and Chandler 2020).

The term DHA (dorsal hysterosomal apertures) proposed by Orwig (1968) for trouessartiids is used to indicate the presence of a pair of dark colored ring-shaped structures situated on the hysteronotal shield at the level of trochanters III. These structures are actually not openings (apertures), but heavily sclerotized (and therefore, dark-colored) patches on the cuticle (Fig. 4A). In some species, these circular structures are not closed, but rather shaped as a C. In many *Trouessartia* species, in which "DHA" are considered "absent", shallow incisions on the lateral margins of the hysteronotal shield are usually slightly darker colored than other areas of the shield, and borders of these patches are often blurry. The recent investigation by Constantinescu *et al*. (2021) clearly illustrated in SEM photos that there are no openings in the areas marked by these patches. The true openings in the dorsolateral cuticle of *Trouessartia* mites are the hysteronotal gland openings *gl*, which are situated on the hysteronotal shield margins, between the levels of setae *e1* and *e2*, usually poorly distinct. In Orwig (1968: 4, Figs. 1, 2), the hysteronotal gland openings *gl* are designated as the second pair of "pores", and in Santana (1976: 3–4, Figs. 1–4), these opening are simply missed. For this reason, using the term DHA is not recommended. Instead, it is more logical to use epithets like "dark sclerotized ring" and "C-shaped sclerotized patch", when the ring is not closed.

In males of the genus *Trouessarta*, the hysteronotal shield is often split or demarked by a transverse fold into two pieces; the anterior part covers the anterior half the hysterosoma, and the posterior part covers the area of the opisthosomal lobes. Following our previous publications (Galloway and Mironov 2019; Mironov and Chandler 2020), these pieces of hysteronotal shields are referred to as prohysteronotal and lobar shields, respectively.

The updated checklist of the genus *Trouessartia* currently includes 147 species, nearly half of which (75) are distributed across 11 species groups (Table 1). The list also includes type hosts of all valid species and the main references containing suitable descriptions and illustrations. Expanded and unified diagnoses of currently recognized species groups and the taxonomic notes on some species are provided below.

Species groups

Group ***appendiculata***

Both sexes. Prodorsal and hysteronotal shields free from scapular and humeral shields, respectively. Hysteronotal setae *d2*, *e2* present. Setae *c2* long, spiculiform. Setae *c3* narrowly lanceolate. Hysteronotal shield with a pair of dark sclerotized rings at level of trochanters III (Fig. 4A). Setae *sR* of trochanters III narrowly lanceolate.

Male. Hysteronotal shield split into prohysteronotal and lobar parts. Opisthosoma strongly attenuate posteriorly, opisthosomal lobes fused along midline forming heavily sclerotized median septum, only distal ends of lobes separated by narrow terminal cleft not extending beyond level of setae *h2* (Fig. 3A). Epimerites IVa large, with anterior ends not extending to genital apparatus. Paragenital apodemes absent. Translobar apodeme present. Terminal lamellae ovate, usually attenuate apically, rarely with concave posterior margin and shaped as a fish tail.

Female. External copulatory tube present. Head of spermatheca with short smooth collar or without it, base of head with or without wrench of short denticles (Fig. 4B). Primary spermaduct without enlargement. Setae *f2* present.

Hosts. Hirundinidae.

Remark. The group currently incorporates 9 species (Santana 1976; Gaud and Atyeo 1986; Mironov and Galloway 2019): *T. ampulicaudata* Mironov and Galloway, 2019, *T. appendiculata*

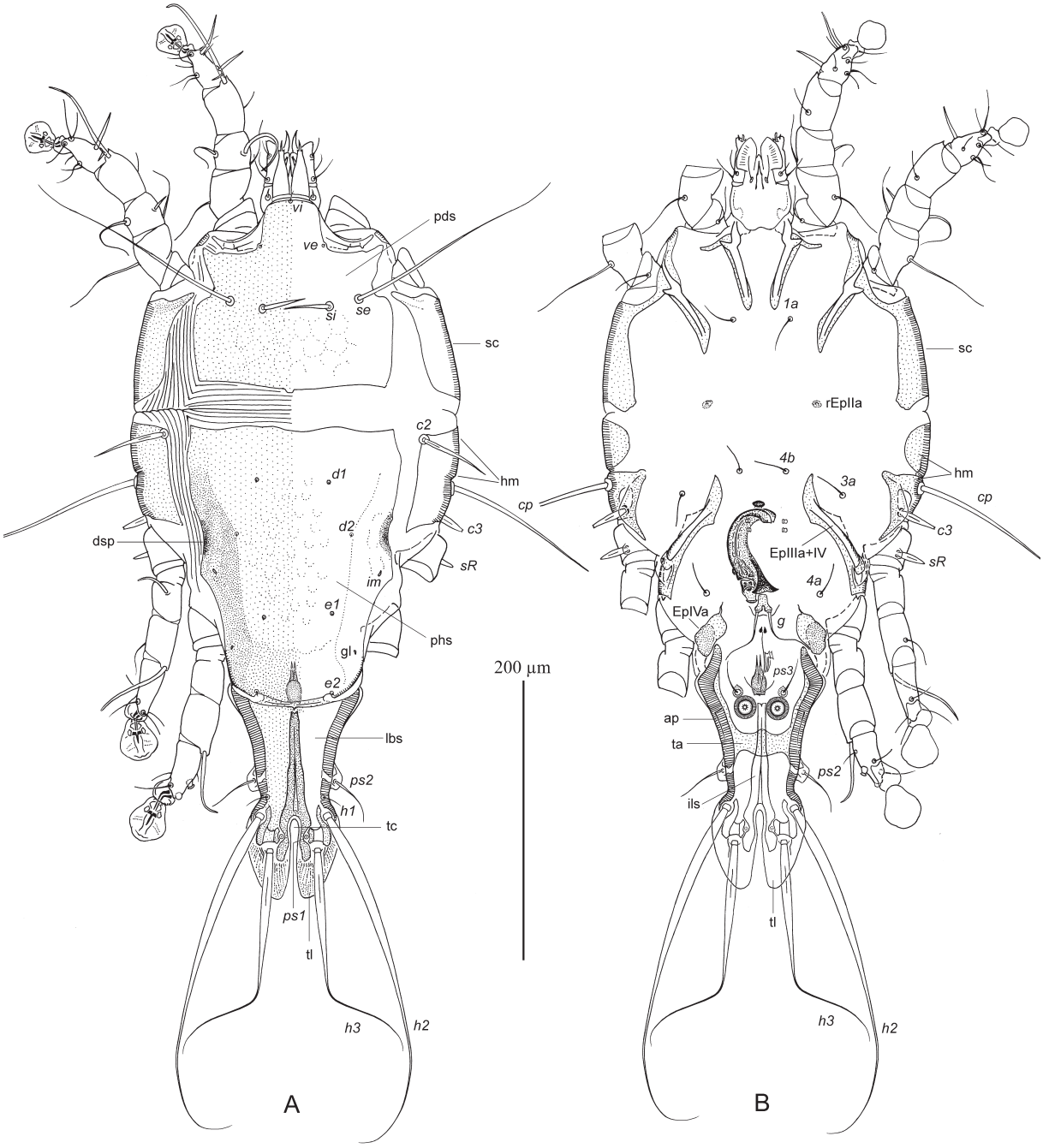

Fig. 1. General view of *Trouessartia* species, male. A—dorsal view, B—ventral view. Abbreviations: ap—apophysis of adanal apodeme, dsp—dark sclerotized patch, EpIIIa+EpIV—combined epimerites IIIa and IV, EpIVa—epimerite IVa, gl—hyseronotal gland opening, hm—humeral shield, ils—interlobar septum, lbs—lobar shield, phs—prohysteronotal shield, pds—prodorsal shield, rEpIIa—rudimentary sclerite of epimerites IIa, sc—scapular shield, ta—translobar apodeme, tc—terminal cleft, tl—terminal lamella.

(Berlese, 1886), *T. exima* Gaud and Atyeo, 1986, *T. gladifera* Gaud and Atyeo, 1986, *T. longiseta* Gaud and Atyeo, 1986, *T. modesta* Gaud and Mouchet, 1958, *T. piscicauda* Gaud, 1957, *T. santani* Gaud and Atyeo, 1986 and *T. sophiae* Gaud and Atyeo, 1986.

Group ***stelgidopteryx***

Both sexes. Prodorsal and hysteronotal shields free from scapular and humeral shields, respectively. Hysteronotal setae *d2*, *e2* present. Setae *c2* short spiculiform. Setae *c3* narrowly lanceolate. Hysteronotal shield with a pair of dark sclerotized

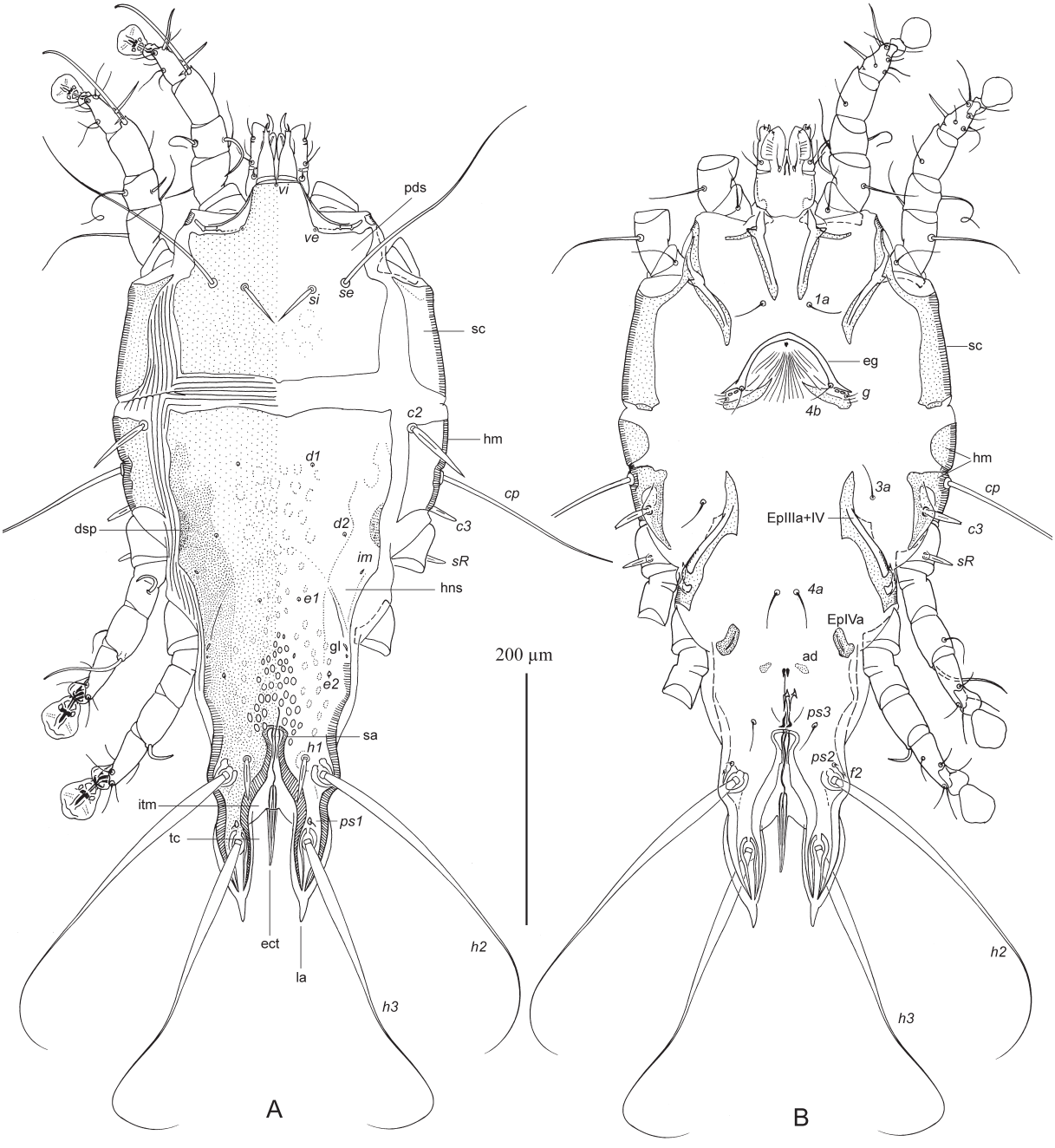

Fig. 2. General view of *Trouessartia* species, female. A—dorsal view, B—ventral view. Abbreviations: ad—adanal shields, ect—external copulatory tube, eg—epigynum, dsp—dark sclerotized patch, EpIIIa+EpIV—combined epimerites IIIa and IV, EpIVa—epimerite IVa, gl—hyseronotal gland opening, itm—interlobar membrane, hm—humeral shield, hns—hysteronotal shield, la—hyaline lobar apex, pds—prodorsal shield, sc—scapular shield, tc—terminal cleft.

rings at level of trochanters III. Setae *sR* of trochanters III narrowly lanceolate.

Male. Hysteronotal shield completely split by transverse band of soft tegument into prohysteronotal and lobar parts; or these parts connected by a pair of narrow sclerotized bridges. Opisthosomal lobes long, separated by large roughly semiovate terminal cleft extending almost to level of adanal suckers. Epimerites IVa narrow, fused by posterior ends to adanal apodemes. Paragenital apodemes absent. Translobar apodeme absent. Terminal lamellae semirounded or semi-ovate, with smooth margin.

Female. External copulatory tube present, usually long stylet- or finger-like. Head of spermatheca with smooth collar, with or without small denticles at base (Fig. 4C). Primary spermaduct

without enlargement or slightly enlarged toward head of spermatheca. Setae *f2* present.

Hosts. Hirindinidae.

Remark. The group incorporates 4 species (Mironov and Galloway 2019): *T. bochkovi* Mironov and Galloway, 2019, *T. cryptocaudata* Mironov

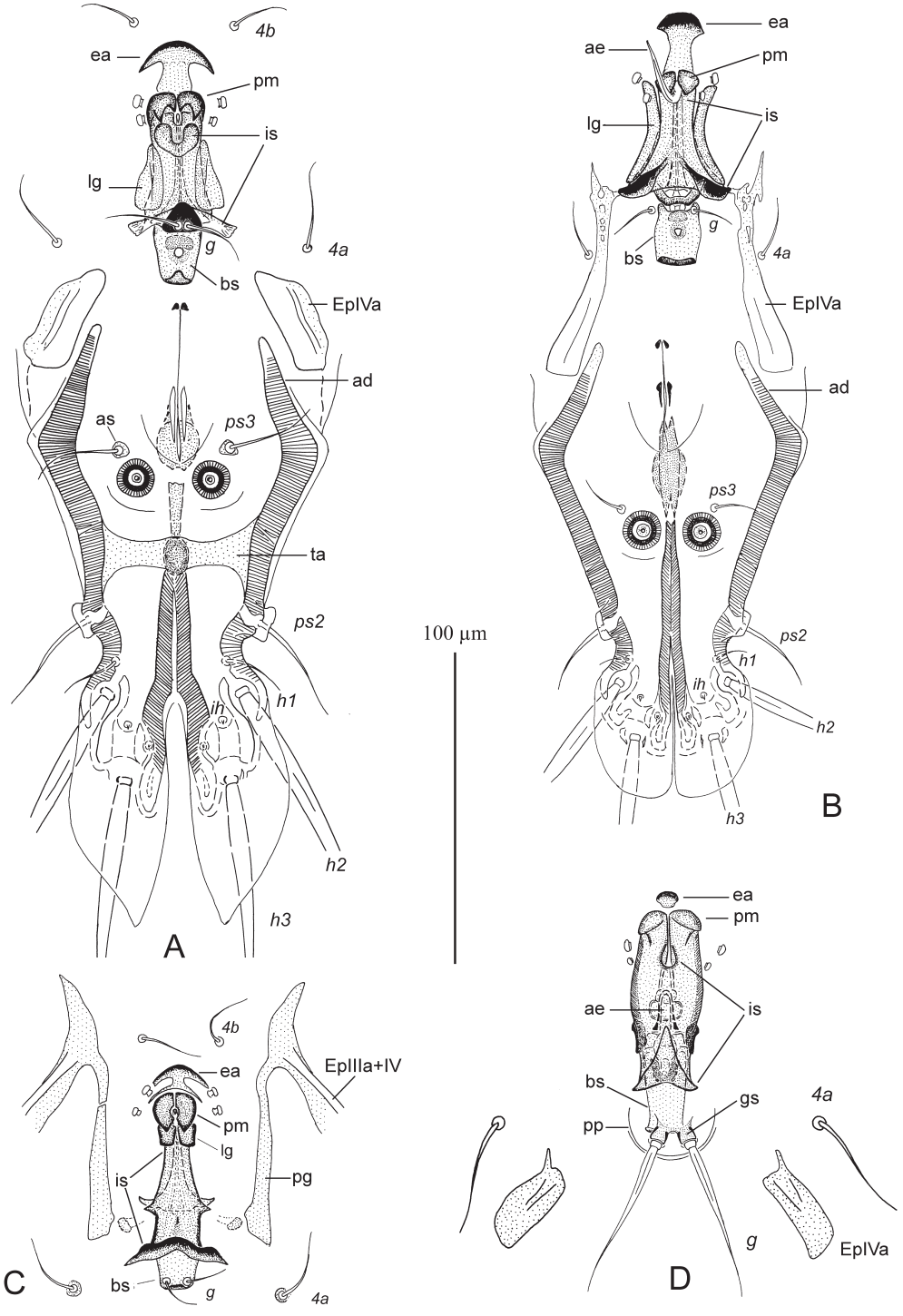

Fig. 3. Details of genital apparatus and opisthosoma of *Trouessartia* males. A—*Trouessartia appendiculata*, opisthosoma and genital apparatus, B—*T. ripariae*, opisthosoma and genital apparatus, C—*T. crucifera*, genital apparatus, D—*T. seiurus*, genital apparatus. Abbreviations: ae—aedeagus, ad—adanal apodeme, as—adanal shield, ea—epiandrum, bs—basal sclerite, gs—genital shield, is—intermedial sclerite, lg—latigenital sclerite, pg—paragenital apodemes, pm—parameres, pp—postgenital plaque, ta—translobar apodeme, EpIIIa+IV—combined epimerites IIIa and IV, EpIVa—epimerites IVa.

and Galloway, 2019, *T. progne* Mironov and Galloway, 2019 and *T. stelgidopteryx* Mironov and Overstreet, 2016.

Group ***crucifera***

Both sexes. Prodorsal and hysteronotal shields free from scapular and humeral shields, respectively. Hysteronotal setae *d2*, *e2* present. Setae *c2* spiculiform. Setae *c3* narrowly lanceolate. Hysteronotal shield with a pair of dark sclerotized rings at level of trochanters III. Setae *sR* of trochanters III narrowly lanceolate.

Male. Hysteronotal shields with deep bow-shaped lateral incisions at level of setae *e2* almost completely separating it into prohysteronotal and lobar shields. Opisthosomal lobes long, close to one another, separated by long and narrow terminal cleft extending beyond level of setae *ps2*. Epimerites IVa narrow, situated lateral to adanal apodemes, not extending to genital apparatus. Paragenital apodemes present, flanking genital apparatus laterally (Fig. 3C). Translobar apodeme absent. Terminal lamellae semi-rounded with smooth margin.

Female. External copulatory tube minute, situated marginally. Head of spermatheca without collar, with a wrench of a few spines (Fig. 4D). Primary spermaduct slightly enlarged toward head of spermatheca. Setae *f2* present.

Hosts. Hirundinidae.

Remarks. The group consists of one species, *T. crucifera* Gaud, 1957. Santana (1976: 42) characterized this species as one of the most atypical in the genus *Trouessartia*. Considering *Trouessartia* species associated with the Hirundinidae, Gaud and Atyeo (1986, 1987) suggested to treat this species as a separate group, because it significantly different from the *appendiculata* and *minutipes* species groups being specific to these birds. Mironov and Galloway (2019) noted that this mite seems to be closest to the *stelgidopteryx* group associated with hirundinids in the New World.

Group ***minutipes***

Both sexes. Prodorsal and hysteronotal shields free from scapular and humeral shields, respectively. Hysteronotal setae *d2*, *e2* absent. Setae *c2* short lanceolate, with blunt apex. Setae *c3* narrowly lanceolate. Hysteronotal shield with a pair of dark sclerotized rings at level of trochanters III. Setae *sR* of trochanters III filiform.

Male. Hysteronotal shield with narrow incisions and bow-shaped furrow, delimiting it into prohysteronotal and lobar parts. Opisthosoma strongly attenuate posteriorly, opisthosomal lobes fused along midline forming heavily sclerotized median septum, only distal ends of lobes separated by narrow terminal cleft not extending beyond level of setae *h2*. Epimerites IVa long, with anterior ends connected to or touching posterior angles of genital apparatus (Fig. 3B). Paragenital apodemes absent. Translobar apodeme absent. Terminal lamellae semi-ovate.

Female. External copulatory tube present or absent. Head of spermateca without collar, with or without wrench of small spines. Proximal part of primary spermaduct gradually enlarged toward head of spermatheca (Fig. 4E). Setae *f2* absent or represented by barely distinct alveoli.

Hosts. Hirundinidae.

Remark. The group currently incorporates 10 species (Santana 1976; Gaud and Atyeo 1987; Mironov and Galloway 2019): *T. amplivasa* Gaud and Atyeo, 1987, *T. botulifera* Gaud and Atyeo, 1987, *T. gabonica* Gaud and Atyeo, 1987, *T. juliettae* Gaud and Atyeo, 1987, *T. microcaudata* Mironov 1983, *T. minutipes* (Berlese, 1886), *T. paludicolae* Gaud and Atyeo, 1987, *T. petrochelidon* Mironov and Galloway, 2019, *T. quarta* Gaud and Atyeo, 1987 and *T. ripariae* Mironov, 1983.

Group ***estrildae***

Both sexes. Prodorsal shield fused with or free from scapular shields, hysteronotal shield free from humeral shields. Hysteronotal setae *d2*, *e2* present. Setae *c2* long, spiculiform or setiform. Setae *c3* narrowly lanceolate. Hysteronotal shield with a pair of dark sclerotized rings or C-shaped patches at level of trochanters III. Setae *sR* of trochanters III narrowly lanceolate.

Male. Hysteronotal shield with deep incisions at level of setae *e2*, partly or completely separating it into prohysteronotal and lobar parts. Opisthosomal lobes long, separated by large- or medium-sized semi-ovate terminal cleft; anterior end of this cleft extending to or beyond level of setae *ps2*. Epimerites IVa present, with anterior ends not extending to genital apparatus, or absent. Paragenital apodemes absent. Translobar apodeme absent. Terminal lamellae short and wide, semi-ovate or trapezoidal with rounded denticles or festoons.

Female. External copulatory tube present, short or minute. Head of spermatheca with short and smooth collar and with various lateral extensions, usually as two pairs of spines (Fig. 4F). Primary spermaduct without enlargement. Setae *f2* present.

Hosts. Estrildidae.

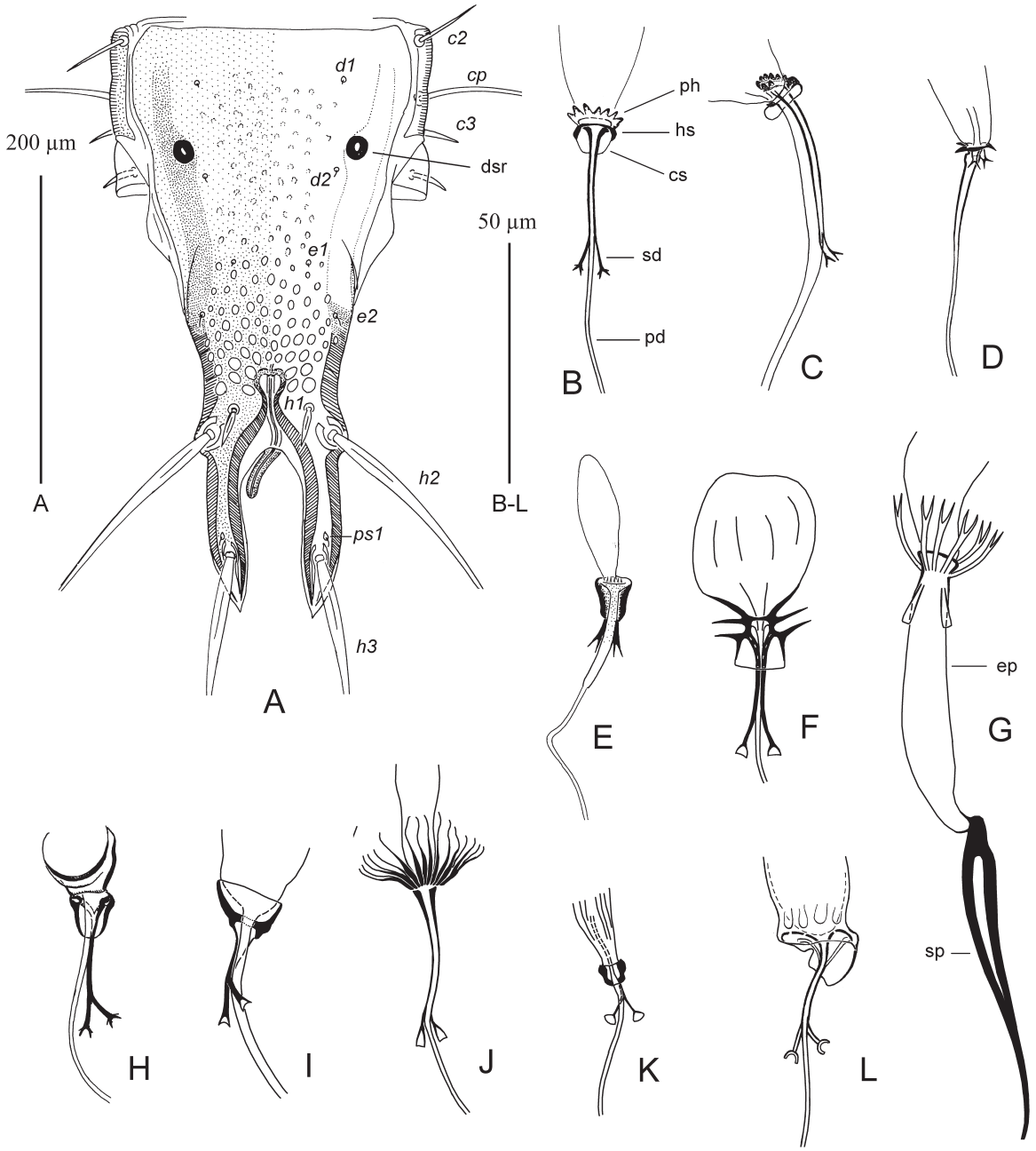

Fig. 4. Hysteronotal shield and spermatheca of *Trouessartia* females. A—hysteronotal shield, B–L—spermatheca and spermaducts. A, B—*Trouessartia appendiculata*, C—*T. cryptocaudata*, D—*T. crucifera*, E—*T. quarta*, F—*T. estrildae*, G—*T. rosterii*, H—*T. seiurus*, I—*T. pytiliae*, J—*T. priniae*, K—*T. angolensis*, L—*T. hernandesi*. Abbreviations: cs—collar of spermatheca head, dsr—dark sclerotized ring, ep—enlarged proximal part of primary spermaduct, hs—head of spermatheca, pd—primary spermaduct, ph—processes of spermatheca head, sd—secondary spermaducts, sp—sclerotized distal part of primary spermaduct.

Remarks. The group incorporates 13 species (Santana 1976; Hernandes and OConnor, 2017). Herein, *Trouessartia bilobata* Trouessart, 1899 is transferred to this group from the *africana* group (Mironov and Kopij 2000). Santana (1976) recognized two subgroups in the *estrildae* group characterized by the following features in males: (a) idiosoma noticeably widened, postgenital plaque absent, genital setae *g* simple filiform (10 species); (b) idiosoma relatively narrow, postgenital plaque present, setae *g* bifurcate (3 species). Subgroup (a): *T. aperta* Gaud and Mouchet, 1958, *T. bilobata* Trouessart, 1899, *T. blanci* Gaud and Mouchet, 1958, *T. curtispina* Gaud and Mouchet, 1958, *T. decorata* Gaud and

Mouchet, 1958, *T. estrildae* Gaud and Mouchet, 1958, *T. kiefferi* Gaud and Mouchet, 1958, *T. multidentata* Gaud and Mouchet, 1958, *T. rousseli* Gaud and Mouchet, 1958 and *T. transatlantica* Hernandes and OConnor, 2017. Subgroup (b): *T. concinna* Gaud and Mouchet, 1958, *T. geometrica* Gaud, 1953 and *T. minuscula* Gaud and Mouchet, 1958.

Group ***rosterii***

Both sexes. Prodorsal and hysteronotal shields free from scapular and humeral shields, respectively. Hysteronotal setae *d2*, *e2* present. Setae *c2* spiculiform. Setae *c3* narrowly lanceolate. Hysteronotal shield with a pair of dark sclerotized rings or C-shaped patches at level of trochanters III. Setae *sR* of trochanters III narrowly lanceolate or spiculiform.

Male. Hysteronotal shield with small incisions and bow-shaped fold at level of setae *e2* delimiting prohysteronotal and lobar parts. Opisthosoma strongly attenuate posteriorly, opisthosomal lobes fused along midline forming heavily sclerotized median septum, only distal ends of lobes separated by narrow terminal cleft not extending beyond level setae *h2*. Epimerites IVa present, with anterior ends not extending to genital apparatus. Paragenital apodemes absent. Translobar apodeme present. Terminal lamellae semi-ovate with dentate margin, or roughly ovate with smooth margin.

Female. External copulatory tube present, moderately long or minute or absent. Head of spermatheca with a wreath or a bunch of processes shaped as long lancets, setae, tentacles or forks (Fig. 4G). Primary spermaduct with ampuliform heavily sclerotized enlargement in distal part. Setae *f2* present.

Hosts. Corvidae, Sturnidae.

Remarks. The group incorporates 9 species, including *T. santosdiasi* Till, 1953 and *T. creatophorae* Mironov and Kopij, 1996, which are herein added to this group. It is possible to recognize two subgroups characterized by the following features in males: (a) terminal lamellae semicircular or semi-ovate in shape, their margin with rounded denticles (7 species); (b) terminal lamellae roughly semi-ovate with smooth margin (2 species). Subgroup (a): *T. corvina* (Koch, 1841), *T. creatophorae* Mironov and Kopij, 1996, *T. eulabis* (Buchholz, 1869), *T. funiculata* Gaud, 1970, *T. liberiana* Gaud, 1961, *T. rosterii* (Berlese,1886) and *T. santosdiasi* Till, 1953. Subgroup (b): *T. corolligera* Gaud, 1968 and *T. pygoceras* (Sundevall, 1837).

Group ***capensis***

Both sexes. Prodorsal and hysteronotal shields free from scapular and humeral shields, respectively. Hysteronotal setae *d2* and *e2* present. Setae *c2* long, spiculiform. Setae *c3* narrowly lanceolate. Lateral margins of hysteronotal shield at level of trochanters III with bow- or bean-shaped sclerotized patch. Setae *sR*III narrowly lanceolate.

Male. Hysteronotal shield completely split into prohysteronotal and lobar parts. Opisthosoma strongly attenuate posteriorly, opisthosomal lobes fused along midline, forming heavily sclerotized median septum, only distal ends of lobes separated by narrow terminal cleft not extending beyond level of setae *h2*. Epimerites IVa large, with anterior ends not extending to genital apparatus (Fig. 3D). Paragenital apodemes absent. Translobar apodeme present. Terminal lamellae semi-ovate, usually attenuate apically, with smooth margin.

Female. External copulatory tube always present, usually long, stylet- or finger-like, situated on the free margin of interlobar membrane. Head of spermatheca with short collar shaped as a semi-ovate extension with smooth margin (Fig. 4H). Primary spermaduct without enlargement. Setae *f2* present.

Hosts. Cardinalidae, Fringillidae, Icteridae, Parulidae, Passerellidae and Thraupidae.

Remarks. The group currently incorporates 16 species (Mironov and Chandler 2020): *T. americana* Mironov and Chandler, 2020, *T. basileuteri* Hernandes, 2014, *T. capensis* Berla, 1959, *T. ciris* Mironov and Chandler, 2020, *T. geospiza* OConnor, Foufoupolos and Lipton, 2005, *T. helmitheros* Mironov and Chandler, 2020, *T. mangaratibensis* Berla, 1959, *T. mniotilta* Mironov and Chandler, 2020, *T. mossambicensis* Till, 1953, *T. passerinae* Mironov and Chandler, 2020, *T. pensylvanica* Mironov and Chandler, 2020, *T. ruticilla* Mironov and Chandler, 2020, *T. seiurus* Mironov and Chandler, 2020, *T. sicaliae* Hernandes, 2014, *T. spizellae* Mironov and Chandler, 2020 and *T. tigrina* Mironov and Chandler, 2020.

It is quite possible that two more species from Thraupidae—*T. megaplax* Černý and Lukoschus, 1975 and *T. unciseta* Černý and Lukoschus, 1975—descriptions of which are incomplete and miss some important details (Černý and Lukoschus 1975), could also belong to the *capensis* species group. Additionally, three species—*T. emberizae* Mironov, 2021 from Emberizidae, *T. jedliczkai* (Zimmermann, 1894) and *T. motacillae* Dubinin, 1952 from Motacillidae—are very close to the *capensis* group and differ from it only in the head of spermatheca having a short collar with denticles (Mironov 2021a).

Group ***africana***

Both sexes. Prodorsal and hysteronotal shields free from scapular and humeral shields, respectively. Hysteronotal setae *d2*, *e2* present. Setae *c2* spiculiform. Setae *c3* narrowly lanceolate. Hysteronotal shield with a pair of dark sclerotized rings at level of trochanters III. Setae *sR* of trochanters III lanceolate.

Male. Hysteronotal shield with deep lateral incisions partly or completely separating it into prohysteronotal and lobar parts. Opisthosoma strongly attenuate posteriorly, opisthosomal lobes fused along midline, forming heavily sclerotized median septum, only distal ends of lobes separated by narrow terminal cleft not extending beyond level of setae *h2*. Epimerites IVa small, with anterior ends not extending to genital apparatus. Paragenital apodemes absent. Translobar apodeme absent. Terminal lamellae roughly semi-ovate with rounded denticles.

Female. External copulatory tube present, minute. Head of spermatheca with short smooth collar or without it (Fig. 4I). Primary spermaduct without enlargement. Setae *f2* absent.

Hosts. Estrildidae.

Remark. The genus includes 3 species: *T. africana* Till, 1954, *T. clytospizae* Gaud and Mouchet, 1958 and *T. pytiliae* Mironov and Kopij, 2000. *Trouessartia bilobata* Trouessart, 1899, which was formerly referred to this group (Mironov and Kopij 2000), is herein transferred to the *estrldae* group.

Group ***tenuipilata***

Both sexes. Prodorsal and hysteronotal shields free from scapular and humeral shields, respectively. Hysteronotal setae *d2, e2* present. Setae *c2* short, narrowly lanceolate or spiculiform. Setae *c3* filiform. Hysteronotal shield with a pair of dark sclerotized rings at level of trochanters III. Setae *sR* of trochanters III spiculiform.

Male. Hysteronotal shield split into prohysteronotal and lobar parts, with a pair of narrow bridges connecting these parts. Opisthosoma strongly attenuate posteriorly, opisthosomal lobes fused along midline forming heavily sclerotized median septum, only distal parts of lobes separated by narrow or medium-sized terminal cleft extending to or beyond level of setae *h2*. Epimerites IVa present or absent; if present, not extending to genital apparatus, fused with adanal apodemes. Paragenital apodemes present. Translobar apodeme absent. Terminal lamellae semicircular with rounded denticles.

Female. External copulatory tube absent, copulatory opening situated submarginally. Head of spermatheca with a wreath of numerous tentacle-like processes (Fig. 4J). Proximal part of primary spermaduct gradually enlarged toward head of spermatheca. Setae *f2* present.

Hosts. Cisticolidae.

Remark. The group includes 4 species (Santana 1976; Mironov and Kopij, 2000): *T. nuttalli* Mironov and Kopij, 2000, *T. priniae* Mironov and Kopij, 2000, *T. quattuordecimdentata* Gaud, 1957 and *T. tenuipilata* Gaud, 1952.

Group ***viduae***

Both sexes. Prodorsal and hysteronotal shields free from scapular and humeral shields, respectively. Hysteronotal setae *d2*, *e2* present. Setae *c2* long, spiculiform, often with filiform apex. Setae *c3* narrowly lanceolate. Lateral margins of hysteronotal shield at level of trochanters III with poorly distinct bow-shaped patches or without them. Setae *sR* of trochanters III narrowly lanceolate.

Male. Hysteronotal shields entire, with small lateral incisions at level of setae *e2*. Opisthosoma strongly attenuate posteriorly, opisthosomal lobes fused along midline forming heavily sclerotized median septum, only distal ends of lobes separated by narrow terminal cleft not extending beyond level setae *h2*. Epimerites IVa small or absent. Paragenital apodemes absent. Translobar apodeme present. Terminal lamellae roughly semicircular, with numerous rounded denticles.

Female. External copulatory tube minute, situated submarginally, in small pocket. Head of spermatheca without distinct collar (Fig. 4K). Primary spermaduct without enlargement. Setae *f2* absent.

Hosts. Estrildidae, Ploceidae, Pycnonotidae, and Viduidae.

Remark. The group includes 4 species (Mironov and Kopij 2000): *T. angolensis* Mironov and Kopij, 2000, *T. baupi* Gaud, 1953, *T. ocellata* Gaud and Mouchet, 1958 and *T. viduae* Gaud and Mouchet, 1958.

Group ***picumni***

Both sexes. Prodorsal shield fused with anterior ends of scapular shield, hysteronotal shield fused with anterior ends of humeral shields. Hysteronotal setae *d2*, *e2* present or absent. Setae *c2* long, spiculiform. Setae *c3* narrowly lanceolate. Lateral margins of hysteronotal shield without noticeable dark patch at level of trochanters III. Setae *sR* of trochanters III filiform.

Male. Hysteronotal shield with short lateral incisions and transverse fold delimiting prohysteronotal and lobar parts of this shield. Opisthosoma strongly attenuate posteriorly, opisthosomal lobes

fused along midline forming heavily sclerotized median septum, only distal ends of lobes separated by narrow terminal cleft not extending beyond level of setae *h2*. Epimerites IVa long, with anterior ends extending or not extending to genital apparatus. Paragenital apodemes absent. Translobar apodeme present. Terminal lamellae ovate and attenuate apically, with smooth margin.

Female. External copulatory tube present or absent. Head of spermatheca with smooth collar, shaped as peak-like extension (Fig. 4L). Primary spermaduct without enlargement. Setae *f2* absent.

Hosts. Picidae.

Remark. The group includes 2 species (Hernandes 2014; Mironov and Bermúdez 2017): *T. hernandesi* Mironov and Bermúdez, 2017 and *T. picumni* Hernandes, 2014.

The checklist of *Trouessartia* species

The updated checklist (Table 1), including 147 valid names of *Trouessartia* species, provides previously established synonyms, type hosts and geographic distribution for the corresponding type hosts. Type host names are given according to the recent list of the birds of the world (Gill *et al*. 2022). Mites belonging to particular species groups diagnosed above are indicated by abbreviations in a separate column. The column "Reference" includes only those containing most suitable descriptions, important notes on taxonomy and major data on host associations and distribution. Exhaustive synonymy and references to all species described before the mid-1970s are given in the revision of the genus by Santana (1976). Below are comments on the synonymy and host associations of some *Trouessartia* species.

1. *Trouessartia appendiculata* (Berlese, 1886). Although the type host of this species is the sand martin *Riparia riparia* (Linnaeus), this original record was likely a case of contamination. This mite is common on swallows of the genus *Hirundo* Linnaeus and has a cosmopolitan distribution owing to its association with the barn swallow *Hirundo rustica* Linnaeus (Santana 1976; Gaud and Atyeo 1986; Mironov and Galloway 2019).

Santana (1976), following the opinion of Oudemans (1937), included *Dermaleichus furcatus* Koch, 1841 from the domestic mouse in the list of synonyms of *T. appendiculata*. Although the name "*furcatus"* is older, Santana did not make any remark that this synonym is questionable. This synonymy is apparently wrong because the mite, pictured by Koch (1841: Heft 33, No. 6), can be unmistakably recognized as a female of a proctophyllodid mite. In particular, the opisthosomal lobes are short and provided with long tentacle-like extensions (i. e., terminal appendages of proctophyllodids), and they bear only one pair of macrosetae (*h2*) situated on the lateral margins. While females of the genus *Trouessartia* have long lobes with short and acute hyaline apical processes and two pairs of macrosetae (*h2*, *h3*). Therefore, herein, *Dermaleichus furcatus* Koch, 1841 is excluded from the synonyms of *T. appendiculata*.

Cooreman (1953) reported *T. appendiculata* from "*Hirundo mayeni* Cabanis" [presently *Tachycineta leucopyga* (Mayen)] in Terra de Fuego, Argentina. This report is an obvious misidentification. The drawing of female given by Cooreman (1953: Fig. 4), in particular, the length of the external copulatory tube, allows to conclude that this mite is *T. bochkovi* Mironov and Galloway, 2019, occurring on swallows of the genus *Tachycineta*.

2. *Trouessartia piscicauda* Gaud, 1957. Although the type host of this species is *Hirundo rustica*, the original record (Gaud 1957) was obviously a case of contamination. This species has never been recollected from *H. rustica* and is actually associated with the sand martin, *Riparia riparia*, as was shown by subsequent studies (Santana 1976; Gaud and Atyeo 1986; Mironov and Galloway 2019).

3. *Trouessartia trouessarti* Oudemans, 1904. This species was originally described from an unidentified species of bats (Chiroptera) on Mariana Islands (Oudemans 1904). Santana (1976) found that this mite actually lives on the great reed warbler *Acrocephalus arundinaceus* (Linnaeus). Taking in attention that *A. arundinaceus* nests in Europe and Western Asia and winters in Africa, it is most probable that the specimens collected by Oudemans (1904) actually originated from closely related reed warblers, *A. stentoreus* (Hemprich and Ehrenberg) or *A. orientalis* (Temminck and Schlegel), distributed in the Central Asian and Oriental regions, respectively.

4. Three species of the genus, *T. cactorum* Berla, 1960, *T. chionidis* Trouessart, 1914 and *T. fulicae* Berla, 1962, were each recorded once from hosts belonging to the orders Psittaciformes, Charadrtiiformes and Gruiformes, respectively, and have never been recollected. These host associa-

tions need checking, since the above records quite probably represent cases of contamination.

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Table 1
Checklist of *Trouessartia* species

No.	Mite species	Species group	Type host	Host family	Distribution	References
1	*T. aedon* Černý and Lukoschus, 1975	–	*Troglodytes aedon* Vieillot	Troglodytidae	Surinam	Černý and Lukoschus 1975
2	*T. africana* Till, 1954	af	*Lagonosticta rubricata* (Lichtenstein, MHC)	Estrildidae	Zimbabwe	Till 1954; Santana 1976
3	*T. alcippeae* Constantinescu, 2016	–	*Alcippe nipalensis* (Hodgson)	Leiothrichidae	India: Meghalaya	Constantinescu *et al*. 2016a
4	*T. amadon*i Santana, 1976	–	*Motacilla aguimp vidua* Sundevall	Motacillidae	Kenya, Mozambique, D.R. Congo, Tanzania, Uganda	Santana 1976
	=*T. motacillae* Till, 1953 (nom. preocc.)	–	*Motacilla aguimp vidua* Sundevall	Motacillidae	Mozambique	Till 1953; Santana 1976
5	*T. amplivas*a Gaud and Atyeo, 1987	mi	*Cecropis semirufa* (Sundevall)	Hirundinidae	Cameroon	Gaud and Atyeo 1987
6	*T. americana* Mironov and Chandler, 2020	ca	*Setophaga americana* (Linnaeus)	Parulidae	USA: Georgia	Mironov and Chandler 2020
7	*T. ampulicaudata* Mironov and Galloway, 2019	ap	*Petrochelidon pyrrhonota* (Vieillot)	Hirundinidae	Canada (Manitoba)	Mironov and Galloway 2019
8	*T. angolensis* Mironov and Kopij, 2000	vi	*Uraeginthus angolensis* (Linnaeus)	Estrildidae	South Africa	Mironov and Kopij 2000
9	*T. angustifolia* Gaud and Mouchet, 1958	–	*Dicrurus atripennis* Swainson	Dicruridae	Cameroon, Gabon, Liberia	Gaud and Mouchet 1958; Santana 1976
10	*T. aperta* Gaud and Mouchet, 1958	es(a)	*Spermophaga haematina* (Vieillot)	Estrildidae	Cameroon	Gaud and Mouchet 1958; Santana 1976
11	*T. apodemata* Hernandes, 2022	–	*Myiophobus fasciatus* (Müller, PLS)	Tyrannidae	Brazil (Maranhão)	Hernandes *et al*. 2022
12	*T. appendiculata* (Berlese, 1886)	ap	*Riparia riparia* (Linnaeus)	Hirundinidae	Cosmopolite: Europe, Africa, S-E Asia, South and North Americas	Berlese 1886; Oudemans 1937; Gaud and Atyeo 1986; Santana 1976; Mironov and Galloway 2019
	=*Trouessartia bacchus* Trouessart in Gaud 1953 nom. nud.	“	*Cecropis semirufa gordoni* (Jardine)	Hirundinidae	West Africa	Gaud 1953
	=*T. phylloscopi* Burdejnaja and Kivganov, 2011 (part, female)	“	*Phylloscopus trochilus* (Linnaeus) (?)	Phylloscopudae	Ukraine	Burdejnaja and Kivganov 2011
13	*T. basileuteri* Hernandes, 2014	ca	*Basileuterus culicivorus* (Deppe)	Parulidae	Brazil (Paraná)	Hernandes 2014

No.	Mite species	Species group	Type host	Host family	Distribution	References
14	*T. baupi* Gaud, 1953	vi	*Euplectes macroura* (Gmelin, JF)	Ploceidae	Cameroon, Central African Republic, Congo	Gaud 1953; Santana 1976
15	*T. bifurcata* (Trouessart, 1885)	–	*Acrocephalus paludicola* (Vieillot)	Acrocephalidae	Europe	Trouessart 1885; Santana 1976
16	*T. bilobata* Trouessart, 1899	es(a)	*Erythrura psittacea* (Gmelin, JF)	Estrildidae	France (New Caledonia), Papua New Guinea	Trouessart 1899; Santana 1976
17	*T. blanci* Gaud and Mouchet, 1958	es(a)	*Nigrita canicapillus* (Strickland)	Estrildidae	Cameroon, Congo, Gabon, Kenya	Gaud and Mouchet 1958; Santana 1976
18	*T. bochkovi* Mironov and Galloway, 2019	st	*Tachycineta bicolor* (Vieillot)	Hirundinidae	Canada (Manitoba)	Mironov and Galloway 2019
19	*T. botulifera* Gaud and Atyeo, 1987	mi	*Ptyonoprogne fuligula* (Lichtenstein, MHC)	Hirundinidae	Kenya	Gaud and Atyeo 1987
20	*T. bulligera* Gaud, 1968	–	*Clytorhynchus hamlini* (Mayr)	Monarchidae	Solomon Islands (Rennell Island)	Gaud 1968; Santana 1976
21	*T. cactorum* Berla, 1960	–	*Eupsittula cactorum* (Kuhl) (?)	Psittacidae	Brazil (Minas Gerais)	Berla 1960; Santana 1976
22	*T. calcealgiana* Hernandes, 2017	–	*Philydor atricapillus* (Wied-Neuwied, M)	Furnariidae	Brazil (Paraná)	Hernandes 2017
23	*T. calliope* Mironov, 2021	–	*Calliope calliope* (Pallas)	Muscicapidae	Russia (Primorye)	Mironov 2021b
24	*T. capensis* Berla, 1959	ca	*Zonotrichia capensis subtorquata* Swainson)	Passerellidae	Brazil (Brasília DF, Espirito Santo, Rio de Janeiro, Minas Gerais), Paraguay	Berla 1959a; Santana 1976; Mironov and Chanler 2020
25	*T. carpi* Till, 1954	–	*Cercotrichas leucophrys* (Vieillot)	Muscicapidae	Zimbabwe	Till 1954; Santana 1976
26	*T. cettiae* Mironov and Zabashta, 2022	–	*Cettia cetti* (Temminck)	Cettiidae	Russia (European part)	Mironov and Zabashta 2022
27	*T. chaquensis* Mauri and De Alzuet, 1968	–	*Scytalopus speluncae* (Ménétriés)	Rhinocryptidae	Argentina, Brazil	Mauri and de Alzuet 1968
28	*T. chionidis* Trouessart, 1914	–	*Chionis alba* (Gmelin, JF) (?)	Chionididae	Antarctica (Peterman Island)	Trouessart 1914; Santana 1976
29	*T. ciris* Mironov and Chandler, 2020	ca	*Passerina ciris* (Linnaeus)	Cardinalidae	USA (Georgia)	Mironov and Chandler 2020
30	*T. clytospizae* Gaud and Mouchet, 1958	af	*Clytospiza monteiri* (Hartlaub)	Estrildidae	Cameroon, Congo	Gaud and Mouchet 1958; Santana 1976
31	*T. coalescens* Gaud and Mouchet, 1958	–	*Chlorocichla simplex* (Hartlaub)	Pycnonotidae	Cameroon, Congo, Nigeria	Gaud and Mouchet 1958; Santana 1976

No.	Mite species	Species group	Type host	Host family	Distribution	References
32	*T. concinna* Gaud and Mouchet, 1958	es(b)	*Spermestes bicolor poensis* (Fraser)	Estrildidae	Cameroon, Congo, Gabon, Equatorial Guinea (=Spanish Guinea)	Gaud and Mouchet 1958; Santana 1976
33	*T. corolligera* Gaud, 1968	ro(b)	*Aplonis insularis* Mayr	Sturnidae	Solomon Islands (Rennell Island)	Gaud 1968; Santana 1976
34	*T. corvina* (Koch, 1841)	ro(a)	*Corvus corone* Linnaeus	Corvidae	Europe	Koch 1841; Santana 1976
35	*T. creatophorae* Mironov and Kopij, 1996	ro(a)	*Creatophora cinerea* (Meuschen)	Sturnidae	South Africa	Mironov and Kopij 1996
36	*T. crucifera* Gaud, 1957	cr	*Hirundo rustica* Linnaeus	Hirundinidae	Cosmopolite: Europe, Africa, Asia (Armenia, Thailand), Argentina, Panamá	Gaud 1957; Gaud and Atyeo 1986; Santana 1976; Arutunjan and Mironov 1983; Mironov and Galloway 2019
37	*T. cryptocaudata* Mironov and Galloway, 2019	st	*Progne subis* (Linnaeus)	Hirundinidae	Canada (Manitoba)	Mironov and Galloway 2019
38	*T. curtifolia* Gaud and Mouchet, 1958	–	*Muscicapa comitata* (Cassin)	Muscicapidae	Cameroon	Gaud and Mouchet 1958; Santana 1976
39	*T. curtispina* Gaud and Mouchet, 1958	es(a)	*Nigrita canicapilla* (Strickland)	Estrildidae	Cameroon, Congo	Gaud and Mouchet 1958; Santana 1976
40	*T. cyanouropterae* Constantinescu, 2016	–	*Actinodura cyanouroptera* (Hodgson)	Leiothrichidae	India (Meghalaya)	Constantinescu *et al*. 2016a
41	*T. daberti* Mironov and Kopij, 2000	–	*Promerops gurneyi* Verreaux	Promeropidae	South Africa	Mironov and Kopij 2000
42	*T. decorata* Gaud and Mouchet, 1958	es(a)	*Spermestes bicolor poensis* (Fraser)	Estrildidae	Cameroon	Gaud and Mouchet 1958; Santana 1976
43	*T. delicatula* Gaud, 1952	–	*Dicrurus forficatus* (Linnaeus)	Dicruridae	Madagascar	Gaud 1952; Santana 1976
44	*T. dicruri* Constantinescu, 2016	–	*Dicrurus aeneus* Vieillot	Dicruridae	India (Meghalaya)	Constantinescu *et al*. 2016b
45	*T. elaeniae* Mironov and González-Acuña, 2013	–	*Elaenia albiceps* (d'Orbigny and Lafresnaye)	Tyrannidae	Chile	Mironov and González-Acuña 2013
46	*T. emberizae* Mironov, 2021	–	*Emberiza tristrami* Swinhoe	Emberizidae	Russia (Primorye)	Mironov 2021a
47	*T. estrildae* Gaud and Mouchet, 1958	es(a)	*Estrilda nonnula* Hartlaub	Estrildidae	Cameroon, Congo, Kenya, Uganda	Gaud and Mouchet 1958; Santana 1976
48	*T. eulabis* (Buchholz, 1869)	ro(a)	*Gracula religiosa* Linnaeus	Sturnidae	Indonesia (Java, Sumatra), Malaysia, Thailand	Buchholz 1869; Santana 1976
48	*T. exima* Gaud and Atyeo, 1986	ap	*Riparia paludicola minor* (Cabanis)	Hirundinidae	Ethiopia, Southa Africa	Gaud and Atyeo 1986

No.	Mite species	Species group	Type host	Host family	Distribution	References
50	*T. fissispina* Černý and Lukoschus, 1975	–	*Elaenia flavogaster* (Thunberg)	Tyrannidae	Surinam	Černý and Lukoschus 1975
51	*T. fulicae* Berla, 1962	–	*Heliornis fulica* (Boddaert) (?)	Heliornithidae	Brazil (Amazonas)	Berla 1962; Santana 1976
52	*T. funiculata* Gaud, 1970	ro(a)	*Mino dumontii* (Lesson, RP)	Sturnidae	Papua New Guinea (Bismark Archipelago), Solomon Islands	Gaud 1970; Santana 1976
53	*T. gabonica* Gaud and Atyeo, 1987	mi	*Pseudhirundo griseopyga* (Sundevall)	Hirundinidae	Gabon, D.R. Congo	Gaud and Atyeo 1987
54	*T. galliardi* Gaud and Mouchet, 1958	–	*Amblyospiza albifrons* (Vigors)	Ploceidae	Cameroon	Gaud and Mouchet 1958; Santana 1976
55	T. *geometrica* Gaud, 1953	es(b)	*Euplectes franciscanus* (Isert)	Ploceidae	Senegal	Gaud 1953; Santana 1976
56	*T. geospiza* OConnor, Foufopoulos and Lipton, 2005	ca	*Geospiza fuliginosa* Gould	Thraupidae	Ecuador (Galapagos Islands)	OConnor *et al*. 2005; Mironov and Chandler 2020
57	*T. gigaphallus* Hernandes, 2017	–	*Tyrannus melancholicus* Vieillot	Tyrannidae	Brazil (Paraná, São Paulo)	Hernandes 2017
58	*T. gladifera* Gaud and Atyeo, 1986	ap	*Delichon urbicum* (Linnaeus)	Hirundinidae	Germany, Russia (European part), Japan	Gaud and Atyeo 1986
59	*T. gonzalezacunai* Mironov, Santillán and Liébana, 2021	–	*Pyrocephalus rubinus* (Boddaert)	Tyrannidae	Argentina	Mironov *et al*. 2021
60	*T. helmitheros* Mironov and Chandler, 2020	ca	*Helmitheros vermivorum* (Gmelin, JF)	Parulidae	USA (Georgia)	Mironov and Chandler 2020
61	*T. hernandesi* Mironov and Bermúdez, 2017	pi	*Leuconotopicus villosus* (Linnaeus)	Picidae	Panamá	Mironov and Bermúdez 2017
62	*T. incisa* Gaud, 1957	–	*Turdus merula mauritanicus* Hartert, EJO	Turdidae	Morocco	Gaud 1957; Santana 1976
63	*T. inexpectata* Gaud, 1957	–	*Curruca melanocephala* (Gmelin, JF)	Sylviidae	Morocco, Algeria	Gaud 1957; Santana 1976
64	*T. jedliczkai* (Zimmermann, 1894)	–	*Motacilla alba* Linnaeus	Motacillidae	Europe, Russia (European part)	Zimmermann 1894; Santana 1976; Mironov 1996
65	*T. juliettae* Gaud and Atyeo, 1987	mi	*Phedina borbonica* (Gmelin, JF)	Hirundinidae	France: Island Reunion	Gaud and Atyeo, 1987
66	*T. kiefferi* Gaud and Mouchet, 1958	es(a)	*Nigrita canicapilla* (Strickland)	Estrildidae	Cameroon, Congo, Gabon, Kenya, Uganda	Gaud and Mouchet 1958; Santana 1976
67	*T. kratochvili* Černý, 1979	–	*Locustella l. luscinioides* (Savi)	Sylviidae	Europe	Černý 1979; Mironov 1996
68	*T. larvivorae* Mironov, 2021	–	*Larvivora sibilans* Swinhoe	Muscicapidae	Russia (Far East)	Mironov 2021b
69	*T. latiducta* Hernandes, 2014	–	*Phylloscartes kronei* Willis and Oniki	Tyrannidae	Brazil (Paraná)	Hernandes 2014

No.	Mite species	Species group	Type host	Host family	Distribution	References
70	*T. latisetata* Gaud, 1952	–	*Hypsipetes madagascariensis* (Müller, PLS)	Pycnonotidae	Madagascar	Gaud 1952; Santana 1976
71	*T. liberiana* Gaud, 1961	ro(a)	*Corvus albus* Müller, PLS	Corvidae	Congo, Kenya, Liberia	Gaud 1961; Santana 1976
	=*T. inversa* Trouessart in Gaud 1952, nom.nud.	“	*Platalea alba* Scopoli (?) (=*tenuirostris*)	Threskiornithidae	Madagascar	Gaud 1952
	=*T. loricata* Trouessart in Gaud 1952, nom.nud.	”	*Atelornis pittoides* (Lafresnaye) (?)	Brachypteracidae	Madagascar	Gaud 1952
72	*T. lonchurae* (Sugimoto, 1941)	–	*Lonchura malacca formosana* (Swinhoe)	Estrildidae	China (Formosa)	Sugimoto 1941; Santana 1976
	=*T.eulobulata* Trouessart in Gaud and Petitot 1948b, nom. nud.	–	*Lonchura malacca formosana* (Swinhoe)	Estrildidae	Vietnam	Gaud and Petitot 1948b
73	*T. longidenticulata* Constantinescu, 2016	–	*Pycnonotus cafer* (Linnaeus)	Pycnonotidae	India (Meghalaya)	Constantinescu *et al*. 2016b
74	*T. longiducta* Hernandes and Valim, 2015	–	*Myiobius atricaudus* Lawrence	Tyrannidae	Brazil (Tocantins)	Hernandes and Valim 2015
75	*T. longifolia* Gaud and Mouchet, 1958	–	*Alethe castanea* (Cassin)	Muscicapidae	Cameroon, Gabon, Equatorial Guinea	Gaud and Mouchet 1958; Santana 1976
76	*T. longiseta* Gaud and Atyeo, 1986	ap	*Cecropis semirufa* (Sundevall)	Hirundinidae	Gabon, Sierra Leone	Gaud and Atyeo,1986
77	*T. marginata* Gaud, 1977	–	*Acridotheres tristis* (Linnaeus)	Sturnidae	Great Britain (St. Helena Island)	Gaud 1977
	=*T. marginata* Trouessart in Gaud and Petitot 1948b, nom. nud.	–	*Acridotheres tristis* (Linnaeus)	Sturnidae	Vietnam	Gaud and Petitot 1948b
78	*T. mangaratibensis* Berla, 1959	ca	*Psarocolius d. decuminatus* (Pallas)	Icteridae	Brazil (Rio de Janeiro, Minas Gerais), Venezuella	Berla 1959b; Santana 1976
79	*T. megadisca* Gaud, 1962	–	*Zosterops rennellianus* Murphy	Zosteropidae	Solomon Islands (Rennell Island)	Gaud 1962; Santana 1976
80	*T. megaplax* Černý and Lukoschus, 1975	–	*Thraupis episcopus* (Linnaeus)	Thraupidae	Surinam	Černý and Lukoschus, 1975
81	*T. microcaudata* Mironov, 1983	mi	*Hirundo rustica* Linnaeus	Hirundinidae	Europe, Africa, Asia (Indonesia, Malaysia, Thailand)	Mironov, 1983; Gaud and Atyeo 1987
	=*T. phylloscopi* Burdejnaja and Kivganov, 2011 (part, male)	“	*Phylloscopus trochilus* (Linnaeus) (?)	Phylloscopidae	Ukraine	Burdejnaja and Kivganov 2011
82	*T. microfolia* Gaud, 1952	–	*Copsychus albospecularis pica* Pelzeln	Muscicapidae	Madagascar	Gaud 1952; Santana 1976

No.	Mite species	Species group	Type host	Host family	Distribution	References
83	*T. minuscula* Gaud and Mouchet, 1958	es(b)	*Estrilda nonnula* Hartlaub	Estrildidae	Cameroon, Congo, Kenya, Uganda	Gaud and Mouchet 1958; Santana 1976
84	*T. minutipes* (Berlese, 1886)	mi	*Delichon urbicum* (Linnaeus)	Hirundinidae	Europe, Africa, Asia (Japan)	Berlese 1886; Gaud and Atyeo 1987; Santana 1976
85	*T. mironovi* Constantinescu, 2013	–	*Acrocephalus melanopogon* (Temminck)	Acrocephalidae	Romania	Constantinescu *et al*. 2013
86	*T. mniotilta* Mironov and Chandler, 2020	ca	*Mniotilta varia* (Linnaeus)	Parulidae	USA (Georgia)	Mironov and Chandler 2020
87	*T. modesta* Gaud and Mouchet, 1958	ap	*Psalidoprocne pristoptera petiti* Sharpe and Bouvier	Hirundinidae	Cameroon	Gaud and Mouchet 1958; Santana 1976; Gaud and Atyeo 1986
88	*T. mossambicensis* Till, 1953	ca	*Crithagra mozambica* (Müller, PLS)	Fringillidae	Cameroon, Malawi, Mozambique, South Africa, Zimbabwe,	Till 1953; Santana 1976
89	*T. motacillae* Dubinin, 1952	–	*Motacill flava tschutschensis* Gmelin, JF	Motacillidae	Russia (Wrangel Island), USA (Alaska)	Dubinin 1952; Santana 1976
90	*T. multidentata* Gaud and Mouchet, 1958	es(a)	*Clytospiza monteiri* (Hartlaub)	Estrildidae	Cameroon, Congo, Uganda	Gaud and Mouchet 1958; Santana 1976
91	*T. niltavae* Constantinescu, 2018	–	*Niltava grandis* (Blyth)	Muscicapidae	India (Meghalaya)	Constantinescu *et al*. 2018b
92	*T. nuttalli* Mironov and Kopij, 2000	te	*Prinia subflava* (Gmelin, JF)	Sylviidae	South Africa	Mironov and Kopij 2000
93	*T. ocellata* Gaud and Mouchet, 1958	vi	*Pycnonotus barbatus gabonensis* Sharpe (?)	Pycnonotidae	Cameroon	Gaud and Mouchet 1958; Santana 1976
	=*T. ploceorum* Gaud and Mouchet, 1958	“	*Ploceus aurantius* (Vieillot) (?)	Ploceidae	Cameroon	Gaud and Mouchet 1958
94	*T. paludicolae* Gaud and Atyeo, 1987	mi	*Riparia paludicola* (Vieillot)	Hirundinidae	Ethiopia, South Africa, Zimbabwe	Gaud and Atyeo 1987
95	*T. passerinae* Mironov and Chandler, 2020	ca	*Passerina caerulea* (Linnaeus)	Cardinalidae	USA (Georgia)	Mironov and Chandler 2020
96	*T. paucidentata* Gaud and Mouchet, 1958	–	*Estrilda nonnula* Hartlaub	Estrildidae	Cameroon, Congo, Kenya	Gaud and Mouchet 1958; Santana 1976
97	*T. pauciseta* Constantinescu, 2021	–	*Alcippe hueti* David, A	Leiothrichidae	China (Guangdong Prov.)	Constantinescu *et al*. 2021
98	*T. pensylvanica* Mironov and Chandler, 2020	ca	*Setophaga pensylvanica* (Linnaeus)	Parulidae	USA (Georgia)	Mironov and Chandler 2020

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99	*T. petrochelidon* Mironov and Galloway, 2019	mi	*Petrochelidon pyrrhonota* (Vieillot)	Hirundinidae	Canada (Manitoba)	Mironov and Galloway 2019
100	*T. picumni* Hernandes, 2014	pi	*Picumnus fulvescens* (Stager)	Picidae	Brazil (Rio Grande do Norte, São Paulo)	Hernandes 2014
101	*T. piscicauda* Gaud, 1957	ap	*Hirundo rustica* Linnaeus	Hirundinidae	Morocco	Gaud 1957; Santana 1976; Gaud and Atyeo 1986; Mironov and Galloway 2019
102	*T. pitanga* Hernandes, 2022	–	*Pitangus sulphuratus* (Linnaeus)	Tyrannidae	Brazil (São Paulo)	Hernandes 2022
103	*T. plocei* Gaud, 1952	–	*Ploceus sakalava* Hartlaub	Ploceidae	Madagascar	Gaud 1952; Santana 1976
104	*T. poeopterae* Gaud and Mouchet, 1958	–	*Poeoptera lugubris* Bonaparte	Sturnidae	Cameroon, Congo, Kenya, Tanzania	Gaud and Mouchet 1958; Santana 1976
105	*T. puylaerti* Gaud, 1993	–	*Lybius bidentatus* (Shaw)	Lybiidae	Togo	Gaud 1993
106	*T. priniae* Mironov and Kopij, 2000	te	*Prinia hodgsoni pectoralis* Legge	Sylviidae	South Africa	Mironov and Kopij 2000
107	*T. progne* Mironov and Galloway, 2019	st	*Progne subis* (Linnaeus)	Hirundinidae	Canada (Manitoba)	Mironov and Galloway 2019
108	*T. pygoceras* (Sundevall, 1837)	ro(b)	*Pastor roseus* (Linnaeus)	Sturnidae	Sri Lanka	Sundevall 1837, 1842; Oudemans 1937; Santana 1976
	=*T. marginata* Trouessart in Gaud and Petitot 1948b nom. nud.	"	*Pastor roseus* (Linnaeus)	Sturnidae	India	Gaud and Petitot 1948b
109	*T. pytiliae* Mironov and Kopij, 2000	af	*Pytilia melba* (Linnaeus)	Estrildidae	South Africa	Mironov and Kopij 2000
110	*T. quarta* Gaud and Atyeo, 1987	mi	*Hirundo rustica* Linnaeus	Hirundinidae	Argentina, Canada (Manitoba), Cuba, Mexico, Panama, Malaysia, Thailand	Gaud and Atyeo 1987; Mironov and Galloway 2019
111	*T. quattuordecimdentata* Gaud, 1957	te	*Cisticola juncidis cisticola* (Temminck)	Cisticolidae	Morocco	Gaud 1957; Santana 1976
112	*T. reguli* Mironov, 1983	–	*Regulus regulus* (Linnaeus)	Regulidae	Europe	Mironov 1983
113	*T. ripariae* Mironov, 1983	mi	*Riparia riparia* (Linnaeus)	Hirundinidae	Europe, Ethiopia, Morocco, Japan, Malaysia, Thailand, Canada (Manitoba), USA (Michigan)	Mironov 1983; Gaud and Atyeo 1987; Mironov and Galloway 2019
114	*T. rosterii* (Berlese,1886)	ro(a)	*Sturnus vulgaris* Linnaeus	Sturnidae	Europe, Morocco, India, North America, Cuba	Berlese 1886; Santana 1976

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115	*T. rotifer* (Trouessart and Neumann, 1888)	–	*Melidectes leucostephes* (Meyer, AB)	Meliphagidae	New Guinea, Solomon Islands (Rennel Island)	Trouessart and Neumann 1888; Santana 1976
116	*T. rousseli* Gaud and Mouchet, 1958	es(a)	*Spermophaga haematina* (Vieillot)	Estrildidae	Cameroon, West Africa	Gaud and Mouchet 1958; Santana 1976
117	*T. rhipidurae* Mironov and Galloway, 2002	–	*Rhipidura f. fuliginosa* (Sparrman)	Rhipiduridae	New Zealand	Mironov and Galloway 2002
118	*T. rubecula* Jabłońska, 1968	–	*Erithacus rubecula* (Linnaeus)	Muscicapidae	Europe	Jabłońska 1968; Santana 1976
119	*T. ruticilla* Mironov and Chandler, 2020	ca	*Setophaga ruticilla* (Linnaeus)	Parulidae	USA (Georgia)	Mironov and Chandler 2020
120	*T. salvadori* Mironov, Santillán and Liébana, 2021	–	*Serpophaga subcristata* (Vieillot)	Tyrannidae	Argentina	Mironov *et al*. 2021
121	*T. santani* Gaud and Atyeo, 1986	ap	*Riparia paludicola* (Vieillot)	Hirundinidae	Angola, Cameroon	Gaud and Atyeo 1986
122	*T. santosdiasi* Till, 1953	ro(a)	*Notopholia c. corrusca* (Nordmann)	Sturnidae	Mozambique	Till 1953; Santana 1976
	=*T. rhombus* Gaud, 1953	"	*Anhinga rufa* (Daudin) (?)	Anhingidae	Senegal	Gaud 1953
123	*T. saularis* Constantinescu, 2018	–	*Copsychus saularis* (Linnaeus)	Muscicapidae	Indonesia (Kalimantan Island)	Constantinescu *et al*. 2018a
124	*T. savanae* Hernandes, 2014	–	*Tyrannus savana* Daudin	Tyrannidae	Brazil (Brasília DF)	Hernandes 2014
125	*T. secaticauda* Gaud, 1968	–	*Rhipidura rennelliana* Mayr	Rhipiduridae	Solomon Islands (Rennell Island)	Gaud 1968; Santana 1976
126	*T. sechellarum* Mironov and Palma, 2016	–	*Copsychus sechellarum* Newton, A	Muscicapidae	Seyshelles	Mironov and Palma 2016
127	*T. seiurus* Mironov and Chandler, 2020	ca	*Seiurus aurocapilla* (Linnaeus)	Parulidae	USA (Georgia)	Mironov and Chandler 2020
128	*T. serrana* Berla, 1959	–	*Turdus a. albicollis* Vieillot	Turdidae	Brazil (Rio de Janeiro)	Berla 1959b; Santana 1976
129	*T. sialiae* Carleton and Proctor, 2010	–	*Sialia sialis* (Linnaeus)	Turdidae	USA (Georgia)	Carleton and Proctor 2010
130	*T. sicaliae* Hernandes, 2014	ca	*Sicalis flaveola* (Linnaeus)	Thraupidae	Brazil (Paraná)	Hernandes 2014
131	*T. simillima* Gaud, 1957		*Muscicapa striata* (Pallas)	Muscicapidae	Cameroon, Morocco	Gaud 1957; Santana 1976
132	*T. sophiae* Gaud and Atyeo, 1986	ap	*Phedina borbonica* (Gmelin, JF)	Hirundinidae	France (Réunion Island), Mauritius	Gaud and Atyeo 1986
133	*T. spizellae* Mironov and Chandler, 2020	ca	*Spizella passerina* (Bechstein)	Passerellidae	USA (Georgia)	Mironov and Chandler 2020

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134	*T. stelgidopteryx* Mironov and Overstreet, 2016	st	*Stelgidopteryx serripennis* (Audubon)	Hirundinidae	USA (Pennsylvania), Mexico, Trinidad	Mironov and Overstreet 2016; Mironov and Galloway 2019
135	*T. stizorhinae* Gaud and Mouchet, 1958	–	*Stizorhina fraseri* (Strickland)	Turdidae	Cameroon, Congo, Gabon	Gaud and Mouchet 1958; Santana 1976
136	*T. subacuta* Gaud and Mouchet, 1958	–	*Muscicapa comitata* (Cassin)	Muscicapidae	Cameroon	Gaud and Mouchet 1958; Santana 1976
137	*T. swidwiensis* Jabłońska, 1968	–	*Luscinia luscinia* (Linnaeus)	Muscicapidae	Europe	Jabłońska 1968; Santana 1976; Mironov 1996
138	*T. tenuipilata* Gaud, 1952	te	*Cisticola cherina* (Smith, A)	Cisticolidae	Madagascar	Gaud 1952; Santana 1976
139	*T. tigrina* Mironov and Chandler, 2020	ca	*Setophaga tigrina* (Gmelin, JF)	Parulidae	USA (Georgia)	Mironov and Chandler 2020
140	*T. tillae* Gaud and Mouchet, 1958	–	*Cossypha cyanocampter* (Bonaparte)	Muscicapidae	Cameroon, Sierra Leone	Gaud and Mouchet 1958; Santana 1976
141	*T. transatlantica* Hernandes and OConnor, 2017	es(a)	*Estrilda astrild* (Linnaeus)	Estrildidae	Brazil (São Paulo), South Africa	Hernandes and OConnor 2017
142	*T. transvaalensis* Till, 1954	–	*Myrmecocichla formicivora* (Wilkes)	Muscicapidae	South Africa	Till 1954; Santana 1976
143	*T. trouessarti* Oudemans, 1904	–	*Acrocephalus arundinaceus* (Linnaeus)	Acrocephalidae	Europe, Africa, Asia	Oudemans 1904, 1910; Santana 1976
144	*T. truncata* Berla, 1959	–	*Sporophila caerulescens* (Vieillot)	Thraupidae	Brazil (Amazonas)	Berla 1959a; Santana 1976
145	*T. unciseta* Černý and Lukoschus, 1975	–	*Loriotus cristatus* (Linnaeus)	Thraupidae	Surinam	Černý and Lukoschus 1975
146	*T. unicolor* Berla, 1959	–	*Haplospiza unicolor* Cabanis)	Thraupidae	Argentina, S-W Brazil	Berla 1959a; Santana 1976
147	*T. viduae* Gaud and Mouchet, 1958	vi	*Vidua macroura* (Pallas)	Viduidae	Cameroon, Congo	Gaud and Mouchet 1958; Santana 1976

Note. Species groups: af—*africana*, ap—*appendiculata*, ca—*capensis*, cr—*crucifera*, es—*estrildae*, mi—*minutipes*, pi—*picumni*, ro—*rosterii*, st—*stelgidopteryx*, te—*tenuipilata*, vi—*viduae*, n-dash—ungrouped species. (a), (b)—corresponding subgroups, see diagnoses of groups. (?)—questionable host association. The old country name "Congo" is used for Santana's (1976) localities, which could not be resolved either to the Democratic Republic of the Congo (Zaire) or the Republic of the Congo.