A REDESCRIPTION OF PTERONYSSIOIDES TYRRELLI
(CANESTRINI, 1899)
A FEATHER MITE FROM THE TREE SWALLOW\(^1\)
(ACARI — ACARIFORMES)

BY
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AND
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*Pteronyssoides tyrrelli* was originally described, as *Pteronyssus fuscus*, by Tyrrell (1882). Tyrrell’s material was from *Tachycineta bicolor* (Vieillot, 1808), but no type locality was designated. Subsequently, Canestrini (1899, in Canestrini and Kramer) pointed out the homonymy of *Pteronyssus fuscus* (Nitzsch, 1818) and *Pteronyssus fuscus* Tyrrell, 1882, proposed *Pteronyssus tyrrelli* as a new name for the latter species, and designated Canada as the type locality.

Hull (1931) restricted the genus *Pteronyssus*, with *Acarus gracilis* Nitzsch, 1818 (? = *Dermaelichus picinus* Koch, 1841) as type, to those species in which the coxal apodemes I are fused. For the species formerly included in *Pteronyssus* in which the coxal apodemes I are separated, Hull proposed the genus *Pteronyssoides* with *Pteronyssus striatus* Robin, 1877 as the type species. Trouessart (1915), however, gave the type species of *Pteronyssus* as *Pteronyssus striatus* Robin, 1877. Baker and Wharton (1952), Dubinin (1953), and Gaud (1953) do not refer at all to the work of Hull (1931, 1934) and list *Pteronyssus striatus* Robin, 1877 as the type species of *Pteronyssus*. Gaud and Mouchet (1959) pointed out the initial mistake of Trouessart and redefined the genera *Pteronyssus* and *Pteronyssoides*.

The genus *Pteronyssoides* may be distinguished from other genera in the *Pteronyssus* complex (*Pteronyssus* Robin, 1868, *Hyonyssus* Gaud and Mouchet, 1959, *Mouchetia* Gaud, 1961, and certain undescribed forms) by the following combination of characters: unpaired vertical seta present; scapular setae borne on prodorsal

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sclerite; coxal apodemes I separated. In the male leg III greatly hypertrophied; anal discs circular in outline; pregenital sclerite large, fused with coxal sclerite III and IV. Female with pregenital sclerite crescent-shaped, expanding at tips, and extending to second pair of genital papillae; coxal apodemes III and IV approximate.

**MATERIALS AND METHODS.**

This study is based on specimens taken from museum study skins and from swallows collected in the field. The museum material was obtained at the following ornithological collections: American Museum of Natural History, New York City; Cleveland Museum of Natural History, Cleveland; and the Ohio State Museum, Columbus. The largest part of the material, and that best suited for study, was collected at the Ohio Agricultural Research and Development Center, North Central Sub-station, Vickery, Ohio. Collection data for birds taken in the field and for bird skins in the above mentioned museum collections are given in Table I.

**TABLE I.**

<table>
<thead>
<tr>
<th>Source of material</th>
<th>Collection Data</th>
<th>Number of <em>P. tyrrelli</em> examined</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field 3-IX-64. Field</td>
<td>7 birds</td>
<td>15 Male</td>
</tr>
<tr>
<td>Ohio D. E. Johnston and W. A. Bruce colls.</td>
<td></td>
<td>13 Female</td>
</tr>
<tr>
<td>American Museum Natural History</td>
<td>AMNH No. 371135. 23-VII-1894. Fairview, N. J. J. Dwight, Jr. coll.</td>
<td>34 Male</td>
</tr>
<tr>
<td>Cleveland Museum Natural History</td>
<td>CMNH No. 26878. 18-IV-1930. Aurora Pond, Portage Co., Ohio. J. S. Alrich coll.</td>
<td>32 Female</td>
</tr>
<tr>
<td>Ohio State Museum</td>
<td>OSM No. 5379. 19-IV-1904. W. F. Henninger collection Ottawa, Ontario.</td>
<td>7 Male</td>
</tr>
<tr>
<td>OSM No. 4655. 28-XI-1881. W. F. Henninger collection W. Bridgewater, Mass. E. J. Shores coll.</td>
<td>5 Female</td>
<td></td>
</tr>
<tr>
<td>OSM No. 3413. 18-XII-1920. Wilson, Florida. W. W. Worthington coll.</td>
<td>1 Male</td>
<td></td>
</tr>
<tr>
<td>OSM No. 3412. 18-XII-1920. Wilson, Florida. W. W. Worthington coll.</td>
<td>4 Female</td>
<td></td>
</tr>
<tr>
<td>OSM No. 6735. 1-VII-1934. Lucas Co., Ohio. L. W. Campbell coll.</td>
<td>4 Female</td>
<td></td>
</tr>
<tr>
<td>OSM No. 3411. 18-XII-1920. Wilson, Florida. W. W. Worthington coll.</td>
<td>2 Male</td>
<td></td>
</tr>
<tr>
<td>OSM No. 4765. 15-X-1894. Shelter Is., N. Y. (Collector not indicated)</td>
<td>2 Female</td>
<td></td>
</tr>
<tr>
<td>OSM No. 4765. 15-X-1894. Shelter Is., N. Y. (Collector not indicated)</td>
<td>4 Female</td>
<td></td>
</tr>
</tbody>
</table>
This table includes only the number of *Pteronyssoides tyrrelli* (Canestrini, 1899) examined and does not indicate the actual number of specimens collected. In addition to the material from *Tachycineta bicolor* mentioned above, *Pteronyssoides* spp. from the following American and European Hirundinidae were studied: *Delichon urbica urbica* (L., 1758); *Tachycineta thalassina lepida* Mearns, 1902; *Progne subis subis* (L., 1758); *Stelgidopteryx ruficollis serripennis* (Audubon, 1838); *Riparia riparia riparia* (L., 1758); *Hirundo rustica erythrogastra* Boddaert, 1783; *Hirundo rustica-rustica* (L., 1758); *Petrochelidon pyrrhonota pyrrhonota* (Viellot, 1817); and *Petrochelidon fulva pallida* Nelson, 1902.

Measurements were made with the aid of an ocular micrometer and were taken whenever feasible. Descriptive statistics are presented in the following manner: \( X \pm S.E. (\text{range}) (C.V.) (n) \). In cases where the data were insufficient for analysis, the individual measurements are given in parentheses.

Signatures of the dorsal and ventral idiosomal and leg chaetotaxy are those of Atjeo and Gaud (1967) (cf. Grandjean, 1939; Knuple, 1959; Fain, 1963) and gnathosomal structures that of Johnston (1965).

**Genus Pteronyssoides Hull.**


*Pteronyssoides tyrrelli* (Canestrini).


**Redescription.**

**Male.** Idiosoma elongate oval, tapering posteriorly and with posterolateral margins concave; length 361.2 ± 1.7; (340.0 − 390.0 u); (2.8); width 206.9 ± 1.7; (185.0 − 232.5 u); (5.1); (35).

**Dorsum** (Figure 1) bearing triangular prodorsal and long, tapering opisthonotal sclerites. Prodorsal sclerite reticulate at posterior and lateral margins; pattern weak anteriorly. Sclerite with internal vertical (\(V_1\)) seta short, unpaired. External vertical (\(V_0\)) setae absent. Scapular setae (\(Sc\)) borne on posterolateral margins of prodorsal sclerite. External scapulars (\(Sc_0\)) long, tapering; situated on small, weakly sclerotized portion of sclerite. Internal scapulars (\(Sc_1\)) short; placed just anterior to \(Sc_0\). Prolateral sclerite small, triangular; extending from base of leg II to level of dorsal seta \(d_4\).
FIG. 1: Male; dorsal aspect; scale equals 200 μ.
Opisthonotal sclerite $142.0 \pm 1.1$; $(25.0 - 55.0)$; $(16.1)$; $(35)$ at anterior margin. Anterior and lateral margins irregular; frequently situated beneath striations. Sclerite tapering laterally to level of leg IV; expanding to width of opisthosoma posterior to leg IV. Sclerite narrowly concave posteriorly. Opisthosomal setae $d_1$, $d_2$, $d_3$ vestigial; only setal bases present. Dorsal seta $d_4$ located on soft cuticle midway between prodorsal and opisthonotal sclerite. $d_5$, $d_6$ situated on opisthonotal sclerite. Lateral setae $l_1$ small; borne on anterolateral margin of coxa III sclerite. Lateral setae $l_2$ somewhat longer than $l_1$; lying in weakly sclerotized area of opisthonotal sclerite. Opisthosomal gland opening at anterior margin of small sclerite; anterior to $d_4$. Notogaster bordered ventrally by a hyaline membrane. Opisthosoma slightly bilobed; each lobe bearing 5 terminal setae. Setal designations from midline to lateral margin are: $a_1$, $a_2$, $l_1$, $a_3$, $d_1$, $a_4$, $l_2$. $a_1$ long; tapering evenly. $d_5$ approximately 2.5 X length of $a_1$. $l_6$ long; 1.3 X length of $d_5$. $a_5$ thick at base and tapering rapidly; approximately 0.5 X length of $a_1$. $d_4$ small, situated dorsolaterally to $a_1$. $l_4$ absent; position represented by vestigial base similar to that of $V_6$.

Venter (Figure 2) with cuticle unsclerotized except for coxal sclerites I-IV, pregenital, genital, and preanal sclerites. Coxal apodemes I not fused. Coxal apodemes II free; widely separated. Coxal apodemes III large; extending to about midpoint of idiosoma and turning acutely inward. Sclerite of coxa III covering portion of dorsal and ventral surface. Sub-humeral setae (sh) dagger-like (32, 29, 34, 33, 32, 30, 35 u); on ridge posteroventral to humeral setae (h). Sclerite of coxa IV fused with pregenital sclerite. Coxal setae (s) and (eg) of medium length; subequal. cx of coxa III slightly longer; pregenital sclerite concave at anterior margin; with finger-like processes extending laterally to posterior margin of genital sclerite. Anterior genital setae ($e_1$) of medium length; on pregenital sclerite. Genital sclerite long, narrow; with lateral margins irregular. Posterior genital setae ($e_2$) short; on posterior end of genital sclerite. Aedeagus small; curved and tapered evenly distally. Preanal sclerite small; anterior portion beneath soft cuticle; all margins irregular. Anal setae ($a$) posterior to preanal sclerite; borne on small sclerotized area surrounding setal base; of medium length; somewhat thickened toward base. Adanal discs circular in outline; with hyaline membrane surrounding each disc.

Chelicerae (Figure 4) normal; chelate-dentate. Movable digit with 2 teeth. Fixed digit with 6 teeth; paraxial and antiaxial teeth adjacent, forming double row; tooth at paraxial surface larger; all teeth pointed apically. Cheliceral apophysis (ch aps) at ventral paraxial surface; directed anteroventrally. Cheliceral seta of medium length; blunt apically and expanding at base. Cheliceral hood (ch hd) present; covering cheliceral seta and base of movable digit. Cheliceral spurs absent.

Subcapitulum (Figure 3). Subcapitular setae present; normal. Supracoxal setae short; expanded slightly at base. Labrum short, blunt. Pseudorutellar
Fig. 2: Male; ventral aspect; scale equals 200 μ.
Fig. 3: Male; subcapitulum; ventral aspect; scale equals 27 μ.

Fig. 4: Male; chelicera; paraxial aspect; scale equals 27 μ.
processes with longitudinal striae; with hyaline flap folded ventrally. Palps normal, with 2 podomeres. Basal podomere with dorsal \(d_2\) and ventral \(v\) setae long, whip-like. Distally, dorsal surface with lyrifissure and hyaline, hood-like apophysis. Terminal podomere with seta \(d_1\) proximal; solenidion and 2 eupathidia distally.

**Legs.** I-II similar, normal. Leg III greatly hypertrophied; extending beyond posterior end of idiosoma. Leg IV small; tarsus not extending beyond end of idiosoma. Leg chaetotaxy: \(1-1-2-1-8, 1-1-2-1-8, 0-0-0-1-6, 0-0-0-1-5\). Solenidialtaxy: \(2-2-2, 1-1-1, 1-1-0, 0-1-0\).

Leg I (Figures 5, 6, 7, 10). Seta \(pR\) of trochanter setiform; directed anteroven-trally. Femur large; with \(vF\) directed posteroven-trally. Genu with \(cG\) dorsal, at proximal end of segment. \(mG\) slightly longer, stouter than \(cG\); arising from posterolateral surface. Solenidion \((\text{sigma}')\) long, setiform. \(\text{Sigma}'\) extremely small, peglike (Figures 6, 7). Tibia with \(gT\) equal in length to \(cG\). Solenidion \((\phi)\) longer, thicker than \(\text{sigma}'\) (I). Tarsus (Figure 10) short; lyrifissure present, normal; hyaline, pouch-like membrane along distal, ventral border. Ambulacrum present; of usual analgesoid type. \(\Omega_{2a}\) of medium length. \(\Omega_{2a}\) somewhat longer; distal to \(\Omega_{2a}\), \(ba\) minute. \(d\) small; contiguous proximally with \(\Omega_{2a}\). \(aa\) absent. \(\Omega_{2a}, ba, d,\) and \(\Omega_{2a}\) in line. \(e\) and \(f\) dorsolateral and opposite in position to \(la\) and \(ra\). Subunquinal seta \((s)\) small, ventral. Unquinal \((v, u)\) and proral \((q, ?)\) setae absent.

Leg II (Figures 8, 9). Leg segments similar to leg I, except femur II not as convex along dorsal surface as femur I. Setae \(pR\), \(cG\), \(gT\) similar to leg I. \(pR\) approximately \(1-1/2\) X length of \(pR\) (I); \(mG\) slightly longer than \(cG\) (I). \(\text{Sigma}\) short, \(9.5 \pm 0.15\); \(9.2 - 10.8\); \(4.4 - 14\) peg-like. \(\phi\) long; not as thick at base as \(\phi\) (I). Tarsus (Figure 9) short; lyrifissure similar to that of tarsus I; pouch-like membrane absent. \(d\) of medium length; in line with \(\Omega_{2a}\) and \(ba\). Setae \(e, f, wa, ra,\) and \(la\) similar, although somewhat shorter than those of tarsus I. \(ra\) more lateral than \(ra\) (I). \(s\) approximately \(2\) X length of \(s\) (I).

Leg III (Figures 11, 16). \(sR\) greater in length than \(pR\) (II). Femur equal to combined lengths of genu and tibia. Genu with \(cG\) and \(uG\) absent. \(\text{Sigma}\) long; usually curving posteriorly. \(kT\) long, arising ventrally. \(\phi\) longer than \(\text{sigma}\); appearing to arise along anterodorsal surface. Tarsus (Figure 16) coneshaped; curved distally. Ambulacrum borne on long stalk arising from anterior surface. \(d\) thick at base; tapering rapidly distally; on proximal end of segment. \(r\) and \(w\) (32, 29, 34, 33, 32, 30, 35 \text{\mu}) narrowly spatulate distally. \(e\) and \(f\) dissimilar. \(e\) short, setiform; \(f\) similar in shape to \(la\).

Leg IV (Figures 12, 15). Trochanter, femur, and genu lacking setae and solenidia. Tibia with \(kT\) of medium length; ventral. \(\phi\) of medium length. Tarsus (Figure 15) with setae \(la\) and \(s\) absent. \(d\) and \(e\) represented by small sucker-like structures. \(f\) normal. Setae \(r\) and \(w\) similar in length and shape.
FIG. 5 : Male; leg I; posterior aspect; scale equals 50 μ.
FIG. 6 : Male; sigma'; dorsal aspect; scale equals 5 μ.
FIG. 7 : Male; sigma'; anterior aspect; scale equals 5 μ.
FIG. 8 : Male; leg II; posterior aspect; scale equals 50 μ.
FEMALE. Idiosoma elongate, oval in outline; length 420.1 ± 1.4; (400.0 — 435.0); (1.9); (35); width 201.5 ± 1.4; (185.0 — 215.0); (4.1); (35).

Dorsum (Figure 19). Dorsum with prodorsal sclerite and setation similar to male. Opisthodorsal sclerite large, rectangular; posterior margin bilobed, appearing "M" shaped. Reticulate pattern of sclerite larger than that of male. Setation of sclerite similar to male. Sclerite of coxa III small; $l_4$ not borne on sclerite. Opisthosoma with paired lateral and terminal opisthondonal sclerites. Lateral sclerites with opisthosomal gland opening anteriorly; $l_6$ medio-lateral. $a_5$ small, dorsal; borne on terminal sclerite. $l_5$ approximately 2/3 X length of idiosoma. $l_5$, somewhat shorter. $a_4$ somewhat shorter. $a_e$ small, fine. $a_5$ small, ventral; lying between setae $a_4$ and $l_5$.

Fig. 9: Male; tarsus II; posterior aspect; scale equals 27 μ.
Fig. 10: Male; tarsus I; posterior aspect; scale equals 27 μ.

Venter (Figure 20). Cuticle unsclerotized except for coxal sclerites I-IV and pregenital sclerite. Coxal apodemes I and II similar to male. Coxal apodeme IV "T" shaped; not fused with coxa III. Sclerite of coxa III bearing $sh$ and $h$; setae in closer proximity than in male. Coxal setae $s$, $c$, and posterior genital setae $c_3$ of medium length; subequal. Coxal III seta ($cx_3$) slightly longer. Anterior genital setae ($c_1$) small; posterior to pregenital sclerite. Pregenital sclerite narrow.

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crescent-shaped; with tips pointed. Sclerite not extending beyond first pair of genital papillae. Genital aperture normal, inverted "V" shaped. Genital apodemes well developed. Anal aperture slitlike; flanked laterally by long anal seta (a).

![Diagram](image)

**FIG. 11:** Male; leg III; posterior aspect; scale equals 75 μ.
**FIG. 12:** Male; leg IV; posterior aspect; scale equals 50 μ.
**FIG. 13:** Female; leg IV; posterior aspect; scale equals 50 μ.
**FIG. 14:** Female; leg III; posterior aspect; scale equals 50 μ.

Gnathosoma. Chelicerae and subcapitulum similar to male.

Legs. Legs I and II similar to male. Legs III and IV normal, similar to one another. Leg III (Figures 14, 17) (excluding ambulacrum) extending to middle of genu IV. sR present, normal. Sigma short; usually curving anteriorly. kT of medium length; arising ventrally. Phi long. Tarsus (Figure 17) with d, e,
and \( f \) similar. \( r \) similar and adjacent to \( w \). \( la \) anterior and in line with \( w \). Leg IV (Figures 13, 18) (excluding ambulacrum) not extending beyond posterior end of body. Trochanter, femur, andge nu lacking setae. \( \Sigma \) absent. \( kT \) similar to \( kT \) (III). \( \phi \) similar to \( \sigma \) of genu III. Tarsus (Figure 18) with \( d, e, \) and \( f \) similar. \( r \) shorter than \( w \); arising from posteroventral surface. \( w \) longest seta present; adjacent to \( r \). \( la \) absent.

DISCUSSION.

This species differs from its congeners in the following combination of characters of the adult male: scapular setae borne on prodorsal sclerite; prodorsal sclerite not fused with prolateral sclerite; \( d_4 \) situated on soft cuticle between prodorsal and opisthosomal sclerites; opisthosomal sclerite reticulate; anterior margin of
FIG. 19: Female; dorsal aspect; scale equals 200 μ.
Fig. 20: Female; ventral aspect; scale equals 200 μ.
pregenital sclerite concave; sh dagger-like; ai lanceolate; and on tarsus III r and w large, narrowly spatulate distally. In the adult female: scapular setae borne on prodorsal sclerite; prodorsal sclerite not fused with prolateral sclerite; opisthosomal sclerite extending beyond level of t 4, with reticulate pattern; sh dagger-like. Associated in all stases with the tree swallow, *Tachycineta bicolor* (Vieillot, 1808).

Since type specimens from Tyrrell's collection are believed to be lost, the identification of specimens in this study is based on the original description by Tyrrell (1882). The diagnosis given by Canestrini and Kramer (1899) agrees with that of Tyrrell (1882), but no information was presented as to whether or not specimens were available to them for study. It is assumed, therefore, that their diagnosis is based on that given by Tyrrell (1882). The description by Tyrrell supports the identification of the specimens used in this study by the following combination of characters: scapular setae (Sc) on prodorsal sclerite; shape and size of prodorsal and opisthodonotal sclerites; coxal apodemes I free; tarsus III cone-shaped, with r and w large; and host, *Tachycineta bicolor* (Vieillot, 1808). From preliminary studies of American and European swallows, mentioned previously, specimens identified as *Pteronyssoides tyrrelli* have been observed to occur only on *Tachycineta bicolor*.

Because of the small sample size and the lack of sufficient geographical representatives, no attempt has been made in this study to examine variation in specimens of *Pteronyssoides tyrrelli* throughout the geographical range of its host. (*T. bicolor* is considered to be Nearctic in distribution (Peters, 1960).) However, individual variation in certain structural features was noted in the specimens studied. In the males the posterolateral border of the opisthodonotal sclerite (Figure 1) was usually observed to be weakly sclerotized, but frequently appears to be free of sclerotization. The finger-like processes of the pregenital sclerite show a great deal of variation at the tips. This area may be straight, pointed and turned mediad, or slightly irregular in outline. The size and shape of the preanal sclerite is extremely variable, although the posterior margin is always concave or inverted “V” shaped.

In the female the greatest variation was observed in the opisthodonotal and opistholateral sclerites (Figure 19). As stated in the redescription, the posterior margin of the opisthosomal sclerite is normally “M” shaped, but the median process was frequently noted to be long and broad or reduced and rather irregular along the margins. The sclerotized area beneath the dorsal striae, in the same region, may be more reduced than illustrated (Figure 19) or so extensive as to extend to the terminal opisthonotal sclerite. The opistholateral sclerites are very irregular marginally, but always narrowed anteriorly.

The chaetotactic system used herein is, for the most part, consistent with that given by Atyeo and Gaud (1967). However, the signatures of the posterior anal setae (pa, pa e) have been changed to a t and a e, respectively to agree in part with Fain (1963). No explanation will be presented at this time as to the criteria used
in determining the chaetotactic relationships of various opisthosomal setae but a
discussion of the dorsal chaetotaxy peculiar to feather mites and related groups
will be the subject of a subsequent paper. In regard to the leg chaetotaxy a point
of clarification should also be made concerning the solenidion $\text{sigma}'$ of genu I.
$\text{Sigma}'$ is situated anterolaterally to $\text{sigma}''$ (Figures 6, 7), is very small, and
because of its thin walled construction and proximity to $\text{sigma}''$, is extremely
difficult to observe. It is best seen in dorsal aspect and is visible in lateral aspect
only with difficulty. Reexamination of our material has shown $\text{sigma}'$ to occur
on all American species of swallow-associated Pteronyssoides available for study.

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