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MACRONYSSIDAE IN WILD BIRD NESTS IN MEXICO, INCLUDING NEW SYNONYMIES, AND THE GENUS *PELLONYSSUS* IN THE NEW WORLD (ACARI: MESOSTIGMATA)

Frank J. RADOVSKY[1] and María Luisa ESTÉBANES-GONZÁLEZ[2]

[1] Department of Entomology, Oregon State University, 2046 Cordley Hall, Corvallis, Oregon 97331, U.S.A.

[2] Instituto Biología, UNAM, Apartado Postal No. 70-153 D.F. CP. 04510 MEXICO

RESUMEN

Pellonyssus nidicolus Baker, Delfinado, and Abbatiello, 1976 es un nuevo sinónimo de *Pellonyssus reedi* (Zumpt y Patterson, 1952). La sinonimia de *Pellonyssus passeri* Clark y Yunker, 1956 con *P. reedi* se mantiene. Los ejemplares de *Pellonyssus* reportados por Estébanes-González (1997) son identificados aquí como pertenecientes en parte a *P. reedi* y en parte a *P. marui* Yunker y Radovsky, 1966, es el primer reporte de estas especies en México. La tercera especie identificada de *Pellonyssus* conocida en el Nuevo Mundo es un parásito de colibrís *Pellonyssus gorgasi* Yunker y Radovsky, 1966, previamente reportado de México. Las claves para identificación de hembras, machos y protoninfas de estas 3 especies se incluyen. Un carácter común se da para comparar rasgos distintivos de las hembras de 9 especies validas de *Pellonysssus* en el mundo. La subespecie *Ornithonyssus sylviarum utrechtensis* Micherdzinski, 1980 es sinonimizada con la subespecie nominal *O. s. sylviarum* (Canestrini y Fanzago, 1877).

Palabras Claves: *Pellonysus, Ornithonyssus*, Macronyssidae, pájaros silvestres, México, Nuevo Mundo, ácaros, parásitos.

ABSTRACT

Pellonyssus nidicolus Baker, Delfinado, and Abbatiello, 1976 is relegated to the status of a junior synonym of *Pellonyssus reedi* (Zumpt and Patterson, 1952). The synonymy of *Pellonyssus passeri* Clark and Yunker, 1956 with *P. reedi* is sustained. The *Pellonyssus* specimens reported by Estébanes-González (1997) are identified here as belonging in part to *P. reedi* and in part to *P. marui* Yunker and Radovsky, 1966, the first records of these species in Mexico. The third identified species of *Pellonyssus* known in the New World is a parasite of hummingbirds, *Pellonyssus gorgasi* Yunker and Radovsky, 1966, previously reported from Mexico. Keys to identify the females, males, and protonymphs of these 3 species are given. A character grid is given to compare features of females of the 9 valid species of *Pellonyssus* in the world. The subspecies *Ornithonyssus sylviarum utrechtensis* Micherdzinski, 1980 is synonymized with the nominal subspecies *O. s. sylviarum* (Canestrini and Fanzago, 1877).

Key Words: *Pellonyssus, Ornithonyssus,* Macronyssidae, wild birds, Mexico, New World, mites, parasites.

INTRODUCTION

Estébanes-González (1997), in reporting on mites that she found in the nests of wild birds in Mexico, identified the *Pellonyssus* specimens that were collected as *P. nidicolus* Baker, Delfinado, and Abbatiello, 1976. Radovsky (1998), in reviewing the known species of *Pellonyssus,* overlooked *P. nidicolus.* Further study of the material identified by Estébanes-González (1997) shows that it comprises 2 *Pellonyssus* species. Because of our uncertainty about the validity of *P. nidicolus,* we examined the relevant type material. In this paper, we establish the new synonymy of *P. nidicolus* under *P. reedi* (Zumpt and Patterson, 1952), comment on other reported synonymies relating to *P. reedi,* provide further information for the separation of *Pellonyssus* species, and reassign collections of *Pellonyssus* reported by Estébanes-González (1997) to *P. reedi* and *Pellonyssus marui* Yunker and Radovsky, 1966, both species reported from Mexico for the first time. We also synonymize *Ornithonyssus sylviarum utrechtensis* Micherdzinski, 1980 under the nominal subspecies and include the specimens identified by Estébanes-González (1997) as *O. s. utrechtensis* in *O. s. sylviarum*.

MATERIALS AND METHODS

The senior author has held material for study of all valid *Pellonyssus* species but one (*Pellonyssus tillae* Cort, 1974, from South Africa), in nearly all cases from the type collection or that had been compared with the holotype (Radovsky, 1998). For the current study, the holotype and only specimen of *P. nidicolus,* inadvertently omitted by Radovsky (1998), and the holotype of *Pellonyssus passeri* Clark and Yunker, 1956 were borrowed; the Mexican material reported by Estébanes-González (1997) was restudied; and additional *Pellonyssus* material from the eastern U.S.A. was obtained.

Ornithonyssus sylviarum series from Mexico, the U.S.A., and Europe were examined.

All measurements are in micrometers.

RESULTS

Pellonyssus reedi (Zumpt and Patterson, 1952)
Synonymy:
Steatonyssus reedi Zumpt and Patterson, 1952, *J. Entomol. Soc. S. Afr.*, 15:163.
Steatonyssus malurus Womersley, 1956, *Proc. Linn. Soc. N.S.W.*, 80:214.

Pellonyssus passeri Clark and Yunker, 1956, *Proc. Helminthol. Soc. Wash.*, 23:94.
Pellonyssus nidicolus Baker, Delfinado, and Abbatiello, 1976, J*. N. Y. Entomol. Soc.*, 84:56, **New Synonymy.**

Baker *et al.* (1976) based their description of *P. nidicolus* on a single female specimen found in an unidentified bird's nest at Farmingdale, Long Island, New York, on 30 June 1973. The description is mostly in general terms, and the length and width of the body are the only measurements given. The "coxal spur formula" was specified as 1-2-2-1; those numbers must refer to the coxal setae, of which 1 on coxa I was evidently overlooked in counting (although shown in figure). The chelicerae and dorsal and ventral views of the idiosoma were illustrated. The authors wrote: "*P. nidicolus* is distinguished from all other species of *Pellonyssus* by the large contiguous dorsal plates bearing uniformly long and strong dorsal setae; the large anal plate, and the uniformly long and strong ventral setae on the integument of the idiosoma."

Examination of the holotype of *P. nidicolus* shows artifacts of mounting, specifically blistering of the integument, that are identical to those shown in the illustrations included with the original description, and so we conclude there have not been significant changes in the appearance of this specimen since it was described and illustrated. There are not any qualitative characters mentioned in that description or that we find in reexamining the holotype to separate it from *P. reedi.* The measurements in Table 1 support the close similarity of the *P. nidicolus* type to the paratype of *P. reedi* from the type collection and a range of other *P. reedi*- assigned specimens from South Africa and elsewhere. Those measurements include the shields and setae that Baker *et al.* (1976) cited as distinguishing *P. nidicolus* from other species in the genus.

Till (1964) published a scholarly revision of *Pellonyssus* that continues to be the primary source for information on the genus. She was first to report the synonymy of *P. passeri* under *P. reedi,* apparently based on the literature only. Our comparison of the holotype of *P. passeri* with a paratype from the same collection as the holotype of *P. reedi,* as well as other material from South Africa, sustains her conclusion. Comparison of other material from South Africa, Mexico, and the eastern U.S.A. adds more weight to her interpretation.

Till (1964) had paratypes of *P. malurus* from Australia on hand when she put that name in synonymy under *P. reedi.* We follow her decision, as have other authors (Micherdzinski, 1980, Domrow, 1987). However, it should be noted that she was tentative regarding this synonymy. She stated that the Australian mites differ from typical *P. reedi* in having the first pair of sternal setae about 3X as long, the sternal shield relatively narrow, and the anal shield relatively short. She wrote,

Table 1

Measurements of *Pellonyssus reedi* Females.

	reedi **paratype**	**Other S. African[1]**	***passeri*** **holotype**	***nidicolus*** **holotype**	**Mexican material[2]**	**Eastern U.S.A.[3]**
Podonotal shield length	270	265-280	270	260	240-275	253-280
Opisthonotal shield length	285	285-300	310	285	270-320	273-307
z4	35	34-35	40	39	33-40	39-42
z5	25	22-25	25	23	24-25	20-24
J1	27	26-27	28	25	27-28	22-25
Z3	20	22-23	25	19	25-26	17-23
Z4	20	19-20	18	19	17-34[4]	15-41[4]
Z5	19	21-23	20,23	19,22	20-23	16-24
Sternal shield length	11	9-13	11	10	11-13	6-10
Sternal shield width[5]	157	120-135	142	118	115-135	124-132
st1[6]	18	17-19	13	13	9-16	10-13
st2	52	53-60	57	54	40-50	42-60
st3	65	80-87	83	72	75-85	70-82
Anal sh. length to postanal s.	85	85-91	87	84	78-84	72-87
Anal shield maximum width	88	85-93	78	79	74-82	72-87
Setae between epig.& anal sh.	31	31-40	34	31	33-37	36-41
Longest caudal setae	76	84-86	81	76	76-81	69-87
Tarsus I length	118	103-138	122	116	93-119	109-136
Length chelicera, 2nd segment with chela	205	205-245	215	217	208-215	200-220

1. n = 6. Ex *Ploceus velatus* [type host of *P. reedi,* given as *Hyphantornis velatus* in original description (Zumpt and Patterson, 1952, but see Zumpt, 1961:57 and Till, 1964:94)], *Passer melanurus, Hirundo albigularis, Creatophora cinerea.*
2. n = 5. Ex nest of *Passer domesticus.*
3. n = 12. Auburn, Alabama, ex 2 nests of *Carpodacus mexicanus.*
4. Z4 measures 15-23, 1 at 28, except in 4 specimens in which it is 15-19 on one side and 31-41 on the other.
5. Rather than true variation, the large range in measurements of the sternal shield width (36.5% of the smallest) evidently results from different degrees of compression of specimens and, to a lesser extent, shrivelling when fixed. Thus, the measured paratype of *P. reedi* was much compressed, while the holotype of *P. nidicolus* may have been shrivelled. The widths of the dorsal shields are not given, because degrees of compression or shrivelling make these measurements meaningless.
6. Measurements of st1 in Australian and a few South African specimens, referred to by Till (1964) but not seen by us, would be several times as long.

"However, two groups of mites from birds in Bechuanaland... combine the features of *P. reedi* and *P. malurus....* [I]t has been decided, for the present to consider these differences to be within the range of intraspecific variation." Her conclusion is plausible from a zoogeographic standpoint, in that (1) other macronyssids associated with volant hosts appear to have achieved a distribution including South Africa and Australia without human assistance, e.g. the bat parasite *Ichoronyssus miniopteri* (Zumpt and Patterson, 1952); and (2) the house sparrow (*Passer domesticus*) is a common host of *P. reedi* and has become nearly cosmopolitan, partly as a result of human transport.

The collections presented as *P. nidicolus* by Estébanes-González (1997) are reassigned as follows:
MEXICO: Temamatla, *Hirundo rustica,* 11/8/85, *Ornithonyssus sylviarum* (Canestrini and Fanzago, 1877); *P. reedi.* MORELOS: Jonacatec, *Columbina inca,* 20/2/86, *P. marui.* Jojutla, Las Huertas, *Leptotila verreauxi,* 6/4/86, *P. marui.* 4 km. N Alpuyeca, Columbina passerina, 19/10/85, *P.marui.* Cuernavaca, Buenavista, *Hirundo rustica* (nest abandoned), 22/10/85, *P. marui.* MICHOACAN: Zinapécuaro, *Campylorhynchus gularis,* 21/6/88, *P. marui.* DISTRITO FEDERAL: Cd. Universitaria, *Passer domesticus,* 28/4/86, *P. reedi.* Zona Sur, *Amazillia beryllina,* 1/9/96, *P. gorgasi* (nest).

Figures 1-6 show the opisthonotal shield and the sternal shield of each of the 3 species of *Pellonyssus* found in the New World. The labelling of the penultimate seta on the opisthonotal shield is here Z4, changed from Radovsky (1998) (where given as S5) due to a reevaluation of the chaetotaxy as part of a general revision of the Macronyssidae. Text references to Z4 in Radovsky (1998) can be similarly corrected to Z3. A text reference in that paper to J5 as being present on the protonymphal pygidial shield is a lapsus calami and should read Z5.

Keys to the females, males, and protonymphs of the 3 New World species of *Pellonyssus* are given below, all 3 now known from Mexico. Table 2 is a matrix of characters that will help in distinguishing females of all 9 species of *Pellonyssus* that are recognized as valid at present.

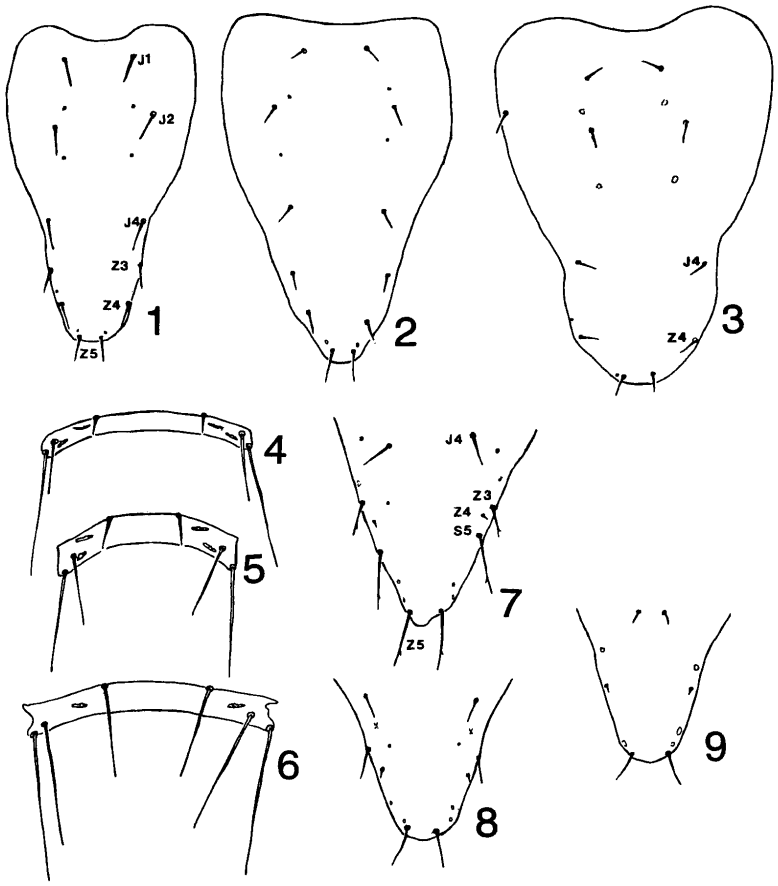
Keys to the *Pellonyssus* Species Found in the Americas

Females

1. Opisthonotal shield with 2 pairs of posterior marginal setae; length of st1 > (or about equal to) 1/2 st2 . . . . . *Pellonyssus gorgasi*
- Opisthonotal shield with 3 pairs of posterior marginal setae; length of st1 < 1/2 st2 2
2. Peritreme ending over coxa I; coxa II without anterior spur; tarsus IV with setae short, all < 1/2 length of tarsus . . . . . *Pellonyssus marui*
- Peritreme ending over middle of coxa II; with anterior spur on coxa II; basitarsus IV with a long seta (pd3) nearly 2/3 length of tarsus . . . . . *Pellonyssus reedi*

Males

1. Opisthonotal shield with 2 pairs of posterior marginal setae . . . . . *Pellonyssus gorgasi*
- Opisthonotal shield with 3 pairs of posterior marginal setae 2
2. Peritreme ending over anterior half of coxa II; coxa II without anterior spur; femur III ventral seta proximal to fissure . . . . . *Pellonyssus marui*
- Peritreme ending over coxa III or between coxae II and III; with spur on coxa II; femur III ventral seta distal to fissure . . . . . *Pellonyssus reedi*



Figures 1-9

1-3: *Pellonyssus* opisthonotal shields (all specimens from Mexico): (1) *P. reedi,* (2) *P. marui,* (3) *P. gorgasi.* 4-6, *Pellonyssus* sternal shields (all specimens from Mexico: (4) *P. reedi,* (5) *P. marui,* (6) *P. gorgasi.* 7-9, *Ornithonyssus* caudal tip of dorsal shields, to show marginal setae: (7) *O. bursa* (Berlese, 1888) (Zambia), (8) *O. sylviarum,* typical (U.S.A.), (9) *O. sylviarum* with “utrechtensis” setal variation (after Micherdzinski, 1980). (Chaetotaxic signatures are shown for setae in Figs. 1, 3 and 7.)

Table 2
Character Matrix of *Pellonyssus* Females[1]

	biscutatus	***trachyphoni***	***similis***	***tillae***	***zosteropus***	***reedi***	***marui***	***gorgasi***	***viator***
Opisthonotal shield with 5 primary setal pairs[2]		+		+				+	
Coxa II anterior spur absent (or inconspicuous)[3]			+		+		+		
Palptrochanter medioventral spur absent			+		+	+	+	+	
Metasternal setae absent		+	+		+	+	+	+	
Peritreme ending over coxa III		+		+					
Peritreme ending over coxa I					+				
Femur III ventral seta distal to suture			+			+	+		
Tarsus IV with 1 or 2 setae > 1/2 length of tarsus	+	+	+		?		+	+	
Sternal shield width: length ratio > or ca. 5:1		+	+	+	+	+	+	+	
Length st3:st1 ratio > or ca. 4:1[4]		+		+		+			
Setae j1 on margin of podonotal sh., not anterior to it									+
Sternal shield with only 1 pair of pores									+
Some caudal setae stout, spinose				+					

1. *Pellonyssus* species: *P. biscutatus* (Hirst, 1921), *P. trachyphoni* Till, 1964, *P. similis* Zumpt and Till, 1954, *P. zosteropus* Till, 1964, *P. tillae* Cort, 1974, *P. marui* Yunker and Radovsky, 1966, *P. reedi* Zumpt and Patterson, 1952, *P. viator* (Hirst, 1921), *P. gorgasi* Yunker and Radovsky, 1966.
2. Shield with Z3 absent from posterolateral margins, (In *P. gorgasi* , 1 or more setae may be secondarily picked up on lateral margins anteriorly).
3. The spur is present in *P. viator* but very small and hence inconspicuous.
4. Australian specimens [ref. *P. malurus* (Womersley)] and a few South African specimens, both included by Till (1964) in *P. reedi,* have st1 relatively long and hence clearly with an st3:st1 ratio < 4:1.

Protonymphs

1. Pygidial shield with 1 pair of setae (1 or 2 additional setal trichopores sometimes touching the lateral margin(s) of the shield); only 1 pair of setae (st1) on sternal shield . . . . . *Pellonyssus gorgasi*
- Pygidial shield with 3 pairs of setae; sternal shield with 3 pairs of setae 2
2. Tarsus IV without any exceptionally long setae, ad3 and pd3 on basitarsus subequal . . . . . *Pellonyssus marui*
- Basitarsus of tarsus IV with pd3 > 3/4 length of tarsus and > 4X length of ad3 . . . . . *Pellonyssus reedi*

Measurements of *P. marui* and *P. gorgasi* females indicate differences from *P. reedi* measurements given in Table 1. The *P. gorgasi* measurements are taken from the ranges given in Radovsky (1998). The *P. marui* measurements are from 1 paratype collected from *Cassidix mexicanus* in Panama and from 1 mite each on *Columbina inca* and *C. parenina* in Mexico (Estébanes-González, 1997). *P. gorgasi* has a longer podonotal shield (295-345); some smaller setae on dorsal shields (z4 22-30, z5 15-20, J1 15-20); greater median length of sternal shield (17-23); much greater length of st1 (40-59); and longer chelicerae (251-285). The *P. marui* specimens have some smaller setae on dorsal shields (z4 20-24, z5 15-18, J1 16-19, Z3 13-16) but Z5 longer (25-33); greater median length of sternal shield (17-22); and average smaller caudal setae (67-70).

Ornithonyssus sylviarum (Canestrini and Fanzago, 1877)

Estébanes-González (1997) recorded *O. sylviarum*, at the species level, from the nests of 3 different birds in 3 passeriform families, including *Catharus occidentalis* (Muscicapidae) from Huitzilac in Morelos. She also noted 3 females of *O. sylviarum utrechtensis* Micherdzinski, 1980 in the nest of *Turdus migratorius* (Turdidae) at the same location in Huitzilac. We consider *O. s. utrechtensis* to be, and here designate it as, a junior subjective synonym of the nominal subspecies *O. s. sylviarum,* **New Synonymy**. Micherdzinski (1980) stated that *O. s. utrechtensis* is distinguishable from the nominal subspecies by the presence of only 2 (rather than 3) setal pairs on the caudal portion of the dorsal shield. He applied this designation to the type series of 6 females, taken from a domestic canary (*Serinus canarius,* family Fringillidae) in Utrecht, the Netherlands.

The genus *Ornithonyssus* is primarily found in the Western Hemisphere, with only a few species having an Old World presence through transport in post-Columbian times (Furman and Radovsky, 1963). A subspecies is usually defined geographically, as a distinctive population occupying part of the range of a species. Subspecies of parasites are also sometimes described as limited to a particular host. Basing a subspecies on individuals associated with a domestic host in one location on the Eurasian continent is contrary to the usual definition. The subspecies concept is based on the idea of a restriction of gene flow between the named population and other populations of the species. For animal groups in general, it has not been intended historically that the formal application of a subspecies trinomial be used for intrapopulation variants (Mayr 1982), in this case potentially restricted to a single locality (within Utrecht) and a single host (the introduced *Serinus canarius*).

O. sylviarum exhibits reduction in the setae on the caudal margins of the dorsal shield, relative to other *Ornithonyssus,* through the loss of the penultimate setal pair

(S5), leaving only 3 pairs (Z3, Z4, Z5), of which Z4 is much reduced as in the genus as a whole (Figs. 7-9). Population samples of *O. sylviarum* typically show variation in the presence of setae of 2 of the 3 remaining pairs, especially Z4 but also Z3. For example, in the 10 females seen from a nest of *Carpodacus mexicanus* in Auburn, Alabama in the eastern U.S.A., 3 are missing Z4 on 1 side, 1 is missing Z4 on both sides, and 1 is missing Z3 on 1 side.

Finding mites with the defining characteristic of *O. s. utrechtensis* (Z3 absent, Z4 and Z5 only present) on *Turdus migratorius* in Mexico further supports the conclusion that the specimens in the type series on *Serinus canarius* in Utrecht are intrapopulation variants and do not represent a separate subspecies.

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