A REVIEW OF THE FLEA GENERA HECTOPSISyllA FRAUENFELD AND RHYNCHOPSISyllUS HALLER (SIPHONAPTERA: PULICIDAE)

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Abstract.—Rhynchopsyllus, a monotypic genus, is proposed as a new junior synonym of Hectopsylla. A key for the 12 species of Hectopsylla is provided with annotation of host preferences and geographical distribution of Hectopsylla pulex (Haller).

Key Words: Hectopsylla, Rhynchopsyllus, Siphonaptera, Pulicidae, key

Rhynchopsyllus pulex described by Haller (1880) has been a source of taxonomic confusion. Schreiter and Shannon (1927) and Traub and Gammons (1950) erected Maxillipsylla lilloi and Rhynchopsyllus megastigmata, respectively, from females only. Tipton and Mendez (1966) subsequently described the male of R. megastigmata from Panama (in the presence of accompanying females). Later Méndez (1977) reported associated males and females from Colombia to be the same as R. megastigmata from Panama, but considered them conspecific with R. pulex. Jordan (1939) synonymized M. lilloi with R. pulex. Jordan and Rothschild (1906), Dalla Torre (1924), and Pinto (1930) each reported the species as Hectopsylla (based only on females). In addition, Anduze et al. (1947) and Cova García and Tallaferro (1959) questioned the status of Rhynchopsyllus because of similarities with Hectopsylla. If one uses the characters described by Hopkins and Rothschild (1953), Panamanian and Colombian males reported by Tipton and Méndez (1966) and Méndez (1977) clearly belong to Hectopsylla. This paper provides observations to support synonymizing the monotypic genus Rhynchopsyllus with Hectopsylla.

Mammalian synonymies follow those of Wilson and Reeder (1993) and avian synonymies are those described in Peters (1934, 1940), Deignan et al. (1964) and Sibley and Monroe (1990). The deposits of material examined for this study are annotated after host/locality data as: The Natural History Museum, London (BMNH), Field Museum of Natural History, Chicago (FMNH), J.C. Beaucournu Collection (JCB), Museum d'Histoire Naturelle, Belgium (Md'HN), Michael W. Hastriter Collection (MWH), Robert E. Lewis Collection (REL), and National Museum of Natural History, Smithsonian Institution, Washington D.C. (USNM).

Genus Hectopsylla Frauenfeld

Hectopsylla Frauenfeld 1860: 464. Type species (by monotypy): Hectopsylla psittaci Frauenfeld.


Maxillipsylla Schreiter and Shannon 1927: 6. Type species (by monotypy): Maxillipsylla lilloi Schreiter and Shannon.

The diagnostic features distinguishing Rhynchopsyllus from Hectopsylla have been based only on females of the former. Jordan (1934) and Hopkins and Rothschild (1953) based separation of these two genera by the morphology of the spermatheca and maxilla. Jordan (1934) specifies the differences as "a long, narrow, pointed and curved maxilla and a conical projection at the orifice of the spermatheca" in Rhynchopsyllus, whereas the maxilla of Hectopsylla is "short and broadly triangular and the orifice of the spermatheca is flush with the surface, not projecting on a cone". More recent descriptions of the male of R. pulex by Tipton and Méndez (1966) and two additional species (H. gracilis Mahnert, 1982 and H. pascuali Beaucournu and Alcover, 1989) provide evidence that would suggest Rhynchopsyllus is synonymous with Hectopsylla. Hectopsylla gracilis and H. pascuali also have sharply pointed maxillae that are directed caudal. Both species clearly belong to Hectopsylla. Comparison of these three species illustrates the similarity of their maxillae (Figs. 19–21). Rhynchopsyllus pulex is the only species among the two genera, which bears a broad conical projection at the orifice of the duct of the spermatheca. Although the spermatheca is morphologically distinct from that of all species of Hectopsylla (except H. stomis to which it is quite similar) the authors consider the conical structure relevant as a species distinction only.

Both genera share a common sessile parasitic mode of life (primarily in the females). Modifications for a sessile mode of life shared by females of both genera include extreme serration and sometimes extreme elongation of the lacinia, angular frons, compression of thoracic segments, partial covering of the anterior portion of antennal fossa, and expansibility of intersegmental abdominal membranes (not truly neosomic). The expansibility of interseg-

mental abdominal membranes is demonstrated most dramatically among females of R. pulex, H. knighti, and H. psittaci (the only species within the two genera with preference for volant hosts). This is most extreme in R. pulex and is accompanied by autoseverence of appendages (a feature of species of Tunga). Evidence of autoseverence in R. pulex includes catabolic scarring of remaining coxae and trochanters, absent in all species of Hectopsylla examined.

Neither males of Rhynchopsyllus, nor Hectopsylla have developed adaptations to accommodate a sessile mode of life (shorter mouthparts, fewer serrations on lacinia, tendency for rounded frons, and inextensible abdomens as demonstrated by examination of mounted male specimens of Hectopsylla previously attached to hosts). The feeding and copulatory behavior of Rhynchopsyllus or Hectopsylla males is virtually unknown. Their lack of abundance on hosts (none for Rhynchopsyllus) would suggest that feeding is minimal (if at all) and the occasional collection of male specimens of Hectopsylla from a host likely occurs while they are seeking females for mating.

The clasper of Rhynchopsyllus is closely allied with that of Hectopsylla, possessing a posteriorly projecting manubrium termed manubrium 2 by Hopkins and Rothschild (1953). The pattern of the aedeagus of Rhynchopsyllus is also similar to those of all species of Hectopsylla. The sclerotized inner tube (S.I.T.) is nearly identical, being extremely long and narrow with a small basal capsule to guide the short penis rod into the S.I.T. (Figs. 5–6, 8). Dorsal to the capsule and running obliquely parallel to the S.I.T. is a heavily sclerotized structure referred to as the crescent sclerite by Tipton and Méndez (1966) in their description of R. pulex males. This pair of sclerites is present in all Hectopsylla species, as well as R. pulex, but is not present in Tunga, or Echidnophaga (the most closely allied genera). Since the structure is dorsal and distinct from the defined capsule of the aedeagus (and not the roof of the capsule = cres-
Table 1. A summary of specimens examined during this study illustrating host preferences within the genus Hectopsylla.

<table>
<thead>
<tr>
<th>Flea species</th>
<th>Chiropteran</th>
<th>Non-Chiropteran Mammal</th>
<th>Aves</th>
<th>Host Unknown</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>H. broscus</em></td>
<td>0</td>
<td>1/13</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><em>H. coniger</em></td>
<td>0</td>
<td>1/7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><em>H. cypha</em></td>
<td>0</td>
<td>5/74</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><em>H. eskevi</em></td>
<td>0</td>
<td>5/40</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><em>H. gemina</em></td>
<td>0</td>
<td>18/54</td>
<td>0</td>
<td>8/6</td>
</tr>
<tr>
<td><em>H. gracilis</em></td>
<td>0</td>
<td>2/9</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><em>H. knighti</em></td>
<td>0</td>
<td>0</td>
<td>0/1</td>
<td>0</td>
</tr>
<tr>
<td><em>H. pascuali</em></td>
<td>0</td>
<td>1/2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><em>H. psittaci</em></td>
<td>0</td>
<td>5/61</td>
<td>0</td>
<td>0/5</td>
</tr>
<tr>
<td><em>H. pulex</em></td>
<td>0/34</td>
<td>0/3</td>
<td>0</td>
<td>3/3</td>
</tr>
<tr>
<td><em>H. stomis</em></td>
<td>0</td>
<td>7/55</td>
<td>0/5</td>
<td>0/4</td>
</tr>
<tr>
<td><em>H. suarezi</em></td>
<td>0</td>
<td>5/6</td>
<td>0/1</td>
<td>0</td>
</tr>
</tbody>
</table>

*0/0 = number of males/number of females.*

cent sclerite), it is not the crescent sclerite. These sclerites are herein referred to as the dorsal armature (D.A.) (Figs. 5–6). The apex of the D.A. of specimens of all species appears fused or at least contiguous with the S.I.T. (Fig. 6) (the position of the D.A. as illustrated in Fig. 5 is atypical of most specimens examined). Based on the common morphological features discussed, the authors consider the monotypic genus *Rhynchopsyllus* a junior synonym of *Hectopsylla.*

**Hectopsylla pulex** (Haller)
(Figs. 6–7, 19)

*Rhynchopsyllus pulex* Haller 1880: 72.
*Rhynchopsylla pulex* Taschenberg 1880: 56.
*Hectopsylla pulex* Jordan and Rothschild 1906: 59, 63.
*Rhynchopsyllus pulex* Cunha 1914: 172.
*Hectopsylla pulex* Dalla Torre 1924: 20.
*Maxillipsylla liloi* Schreiter and Shannon 1927: 6 (type species of *Maxillipsylla*, by monotypy).
*Rhynchopsyllus pulex* Ewing 1929: 158.
*Hectopsylla pulex* Pinto 1930: 332.
*Hectopsylla pulex*: Cova García and Tallaferro 1959: 331.
*Rhynchopsyllus pulex*: Tamsitt and Fox 1970: 1093; Tipton and Machado-Allison 1972: 4; Méndez 1977: 164 (synonymy of *R. megastigmata*).

Material examined.—ARGENTINA: Buenos Aires, 1 ♀, Ex: *Nyctinomus brasiliensis* = *Tadarida brasiliensis* (I. Geoffroy) (BMNH). BOLIVIA: S. Cruz de la Sierra, 2 ♀, Ex: *Molossus obscurus* = *Molossus molossus* (Pallas) (BMNH); Magdalena, Dept. Beni, 2 ♀, Ex: *Eumops bonariensis* (Peters), 12 Nov 1966; Mag dalena, Dept. Beni, 1 ♀, Ex: *Noctilio lalialis* = *Noctilio albiventris* Desmarest, 20 Aug 1964 (USNM). BRAZIL: 1 ♀ (paratype), Ex: *Molossus sp.; Lagôa Santa, 1 ♀, Ex: *Eumops perotis* (Schinz), 2 Feb 1916 (BMNH); Lagôa Santa, 2 ♀,

Remarks.—Hectopsylla pulex, one of 12 species of Hectopsylla, occurs primarily on bats of the family Molossidae and to a lesser extent on Vespertilionidae. The remaining species parasitize either Aves (*H. knighti*, *H. psittaci*) or non-Chiropteran mammals (Caviidae: *H. cypha*, *H. eskeyi*, *H. gemini*, *H. suarezi*; Muridae: *H. pascualii*, *H. gracilis*; Mustelidae: *H. broscus*, *H. coniger*; and Chinchillidae: *H. stomis*) (Table 1). The known country records of Hectopsylla pulex, its host species and host synonymies are listed in Table 2. The occurrence of a single female of *H. pulex* on Zonotrichia pileata = *Zonotrichia capensis* (Müller) (reported in Cunha 1914) and three females examined from the Murid rodent *R. leucodactylus* are likely accidental associations.

Little is known about the life cycle of *H. pulex*. Females have been collected frequently on chiropteran hosts while males have been collected only from bat guano associated with species of *Molossus* in Colombia and Panamá.

**KEY TO SPECIES OF HECTOPSyllA**

1. Maxilla rounded at apex (Fig. 11) (male unknown) ......................................................... *knighti*
   - Maxilla broadly angular to sharply pointed at apex (Figs. 12–22) ................................. *psittaci*

2. Segment V of all tarsi with seven or eight (usually eight) lateral planter bristles; tarsal claws with a prominent basal tooth; metepimeron of female without a process on dorso-posterior margin of metepimeron .................. *psittaci*
   - Segment V of all tarsi with at most six pairs of lateral planter bristles; tarsal claws without a prominent basal tooth; metepimeron of female nearly always with a process at dorso-posterior margin (Fig. 2) (except *pulex*) .................. *pulex*

3. Male ................................................................................................................................. *knighti* (3)
   - Female ......................................................................................................................... *psittaci* (13)

4. P1 of clasper narrower at apex than at base (Figs. 3, 7) ....................................................... *pulex* (5)
   - P1 of clasper broader at apex than at base (Fig. 4) ........................................................... *knighti* (4)

5. Tarsal segments V with six pairs of lateral planter bristles; median dorsal lobe of aedeagus absent or vestigial .................................................. *knighti* (4)
   - Tarsal segments V with five or fewer pairs of lateral planter bristles on tarsi; median dorsal lobe well developed (Fig. 5) ................................................. *pulex* (6)

6. P2 and P1 of clasper pincer-like (Fig. 4); distal arm of st. IX divided into several lobes; fifth tarsal segments with four pairs of lateral planter bristles ........................................... *stomis* (P2 and P1 not pincer-like (Fig. 7); distal arm of st. IX composed of a single lobe; fifth tarsal segments with five pairs of lateral planter bristles .................................................................................. *pulex* (P2 and P1 not pincer-like (Fig. 7); distal arm of st. IX composed of a single lobe; fifth tarsal segments with five pairs of lateral planter bristles .................................................................................. *pulex* (6)

7. Median dorsal lobe of aedeagus poorly developed, at most discernible ................................... *pulex* (5)
   - Median dorsal lobe well developed (Fig. 5); distinctly visible ........................................... *stomis* (6)

8. Median lobe (L3) of distal portion of st. IX enlarged with concavity at ventral margin, apical margin of P1 of clasper straight; P1 not bifurcate apically .................................................. *gracilis* (7)
   - Ventral margin of L3 lacking concavity; apical
Table 2. Distribution and host-parasite relationships of Hectopsylla pulex.

<table>
<thead>
<tr>
<th>Country</th>
<th>Host species</th>
<th>Flea sex</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>Myotis nigricans (Schinz)</td>
<td>?</td>
</tr>
<tr>
<td></td>
<td>Nyctinomus brasiliensis = Tadarida brasiliensis (L. Geoffroy)</td>
<td>?</td>
</tr>
<tr>
<td></td>
<td>Promops perotis = Eumops perotis (Schinz)</td>
<td>?</td>
</tr>
<tr>
<td></td>
<td>Zonotrichia pileata = Zonotrichia capensis (Müller)</td>
<td>?</td>
</tr>
<tr>
<td>Bolivia</td>
<td>Eumops bonariensis (Peters)</td>
<td>?</td>
</tr>
<tr>
<td></td>
<td>Molossus obscurus = Molossus molossus (Pallas)</td>
<td>?</td>
</tr>
<tr>
<td></td>
<td>Noctilio labialis = Noctilio albiventris Desmarest</td>
<td>?</td>
</tr>
<tr>
<td>Brazil</td>
<td>E. perotis</td>
<td>?</td>
</tr>
<tr>
<td></td>
<td>Histiotus velatus = Histiotus velatus (L. Geoffroy)</td>
<td>?</td>
</tr>
<tr>
<td></td>
<td>Molosus bondae J. A. Allen</td>
<td>?</td>
</tr>
<tr>
<td></td>
<td>Molossus obscurus = M. molossus</td>
<td>?</td>
</tr>
<tr>
<td></td>
<td>Molossus rufus = Molossus ater E. Geoffroy</td>
<td>?</td>
</tr>
<tr>
<td></td>
<td>Nyctinomus brasiliensis = T. brasiliensis</td>
<td>?</td>
</tr>
<tr>
<td></td>
<td>Nyctinomus macrotis = Nyctinomops macrotis (Gray)</td>
<td>?</td>
</tr>
<tr>
<td>Colombia</td>
<td>Molossus bondae</td>
<td>?</td>
</tr>
<tr>
<td></td>
<td>Molossus major = M. molossus</td>
<td>?</td>
</tr>
<tr>
<td></td>
<td>Molossus molossus major = M. molossus</td>
<td>?</td>
</tr>
<tr>
<td></td>
<td>M. molossus</td>
<td>δ/?</td>
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<tr>
<td></td>
<td>Molossus obscurus obscurus = M. molossus</td>
<td>?</td>
</tr>
<tr>
<td></td>
<td>Noctilio labialis = Noctilio albiventris</td>
<td>?</td>
</tr>
<tr>
<td>Ecuador</td>
<td>„Bat”</td>
<td>?</td>
</tr>
<tr>
<td></td>
<td>Rhhipidomyx leucodactylus (Tschudi)</td>
<td>?</td>
</tr>
<tr>
<td>México</td>
<td>E. perotis</td>
<td>?</td>
</tr>
<tr>
<td>Panamá</td>
<td>Tadarida yucatanica = Nyctinomops laticaudatus (E. Geoffroy)</td>
<td>?</td>
</tr>
<tr>
<td>Perú</td>
<td>Histiotus sp.</td>
<td>?</td>
</tr>
<tr>
<td></td>
<td>Molossus obscurus = M. molossus</td>
<td>?</td>
</tr>
<tr>
<td></td>
<td>Tadarida brasiliensis</td>
<td>?</td>
</tr>
<tr>
<td>Trinidad</td>
<td>„Bat”</td>
<td>?</td>
</tr>
<tr>
<td>United States</td>
<td>E. perotis</td>
<td>?</td>
</tr>
<tr>
<td>Venezuela</td>
<td>Tadarida mexicana = T. brasiliensis</td>
<td>?</td>
</tr>
<tr>
<td></td>
<td>M. major = M. molossus</td>
<td>?</td>
</tr>
<tr>
<td></td>
<td>M. obscurus = M. molossus</td>
<td>?</td>
</tr>
<tr>
<td></td>
<td>Myotis nigricans</td>
<td>?</td>
</tr>
<tr>
<td></td>
<td>Vesperpilto fuscus = Eptesicus fuscus (Beauvois)</td>
<td>?</td>
</tr>
</tbody>
</table>

1 Host synonymy after Wilson and Reeder (1993).
2 Only known record occurring on a bird.
3 Only known record occurring on a non-Chiropteran mammal.

9. Dorso-posterior margin of metepimeron with a caudally directed process (Fig. 2) coniger
   Dorso-posterior margin of metepimeron entire, lacking process pascuali

10. Sclerotized inner tube (S.I.T.) with a sharp thorn-like spine at ventral midpoint (Fig. 8); apex of ventral lobe (L') of distal portion of st. IX pointed; fifth tarsal segments with three pairs of lateral plantar bristles (some with three and four on same metatarsus) gemina
    S.I.T. without thorn-like spine at ventral mid-

point, if with tubercle or protuberance then rounded and blunt (Fig. 5); apex of L' rounded; fifth tarsal segments with either four or five pairs of lateral plantar bristles

11. L² with lateral patch of long thin setae; usually four pairs of lateral plantar bristles on fifth tarsal segments cypha
    - L² without lateral patch of setae, but with verti-cal line of setae; four or five pairs of lateral plantar bristles on fifth tarsal segments

12. Fifth tarsal segments with four pairs of lateral plantar bristles
    - Fifth tarsal segments with five pairs of lateral plantar bristles nuarezi
13. Metepimeron with a dorso-posterior projection (Fig. 2) ........................................ 14
   Metepimeron without a dorso-posterior projection ........................................ pulex

14. Posterior margin of occiput with a well defined lobe (Fig. 1) ......................... 15
   Posterior margin of occiput without a well defined lobe (though slightly indicated in eskeyi) ..................................................

15. Tergum II with three setae per side and t. VII with two or three setae per side; frons with convex angle midway between oral angle and internal incrasaation (Fig. 1); five or six (usually six) lateral plantar bristles on fifth tarsal segments ........................................ bросcus
   Tergum II with one or two setae per side and t. VII with one per side; frons with angular projection immediately below internal incrasaation: three lateral plantar bristles on fifth tarsal segments ........................................ coniger

16. Sclerotized rim of sensillal plate anterior to sensillal pits greater than twice width of double row of pits ......................................................... stomis
   Sclerotized rim of sensillal plate anterior to sensillal pits at most as wide as double row of pits .........................................................

17. Fifth tarsal segments with three pairs of lateral plantar bristles; ventral apical margin of t. VIII with tooth-like projection ........................................ gemina
   Fifth tarsal segments with either four or five pairs of lateral plantar bristles; ventral apical margin of t. VIII without tooth-like projection ........................................

18. Fifth tarsal segments with five pairs of lateral plantar bristles (occasional specimens may have four and five on the same tarsus) ........................................ suarezi
   Fifth tarsal segments with four pairs of lateral plantar bristles ........................ 19

19. Dorsal margin of metepimeron heavily sclerotized, sclerotization extending to apex of process which is markedly turned down: usually three setae on metepimeron ........................................ cypha
   Dorsal margin of metepimeron not noticeably sclerotized (Fig. 2); usually four setae on metepimeron ........................................

20. Hilla of spermatheca nearly as wide throughout as width of bulga; duct of spermatheca connecting at cribiform area of bulga on ventral margin ........................................ eskeyi
   Hilla of spermatheca much narrower than width of bulga, with marked narrowing from base of bulga to apex of hilla; duct of spermatheca connecting at cribiform area of bulga on ventral apical margin ........................................

21. Base of metatarsal claw with small cleft, or sinus (Fig. 9) ........................................ pascualis
   Base of metatarsal claw without cleft, or sinus (Fig. 10) ........................................ gracilis

OTHER MATERIAL EXAMINED

Hectopsylla broscus Jordan and Rothschild 1906
(Fig. 12)

Material examined.—ARGENTINA: Central Pampa, 1 ♂ (lectotype), Ex: Conepatus humboldtii Gray; Central Pampa, 5 ♀ (parallectotypes), Ex: C. humboldtii; San Rafael, Mendoza Prov., 1 ♂, 1 ♀, Ex: Conepatus suffocans = C. chinga (Molina); Don Roberto, San Luis Prov., 1 ♀, Ex: Conepatus chinque = C. chinga, 14 Jun 1962: “Southern Argentina,” 5 ♀, Ex: Zaedyus pichi (Desmarest), 30 Jun 1962 (BMNH).

Remarks.—All records of this species are restricted to Argentina and skunks of the genus Conepatus appear to be the preferred host.

Hectopsylla coniger Jordan and Rothschild 1906
(Fig. 17)

Material examined.—BOLIVA: Pampa Olliga, 1 ♂ (lectotype), Ex: Conepatus arquae = C. chinga, 19 Oct 1901; Pampa Olliga, 1 ♀ (lectoallotype), 6 ♀ (parallectotypes), Ex: C. chinga, 19 Oct 1901 (BMNH).

Hectopsylla cypha Jordan 1942
(Fig. 14)

Material examined.—ARGENTINA: Las Catitas, Mendoza Prov., 9 ♀ (paratypes), Ex: Octomys barreræ = Tymanoctomys barreræ (Lawrence), Jul 1939; Mendoza, 1 ♀, Ex: Microcavia australis (I. Geoffroy and d'Orbigny), 6 Aug 1959; Puesto “La Carpa,” Mendoza, 5 ♀, Ex: Graomys griseoflavus griseoflavus = Graomys griseoflavus (Waterhouse), 12, 14 Jul 1959; Puesto “La Carpa,” Mendoza, 2 ♀, Ex: M. australis, 13, 15 Jul 1959; San Rafael, Mendoza Prov., 1 ♀ (neoallotype), 2 ♂, 52 ♀ (paratypes), Ex: M. australis, Apr–Jul 1939; Santa Rosa, Mendoza Prov., 2 ♂, 4 ♀ (paratypes), Ex: M. australis, Jul 1939
Hectopsylla eskeyi Jordan 1933
(Figs. 2, 4–5, 18)

Material examined.—BOLIVIA: Pucará, elev. 2,400 m, 1 ♂, Ex: G. griseoflavus, 28 Sep 1954; Samaipata, Dept. Santa Cruz, elev. 1,650 m, 1 ♂, Ex: G. griseoflavus, 28 Jan 1955; Serrano, Dept. Chuquisaca, elev. 2,160 m, 1 ♂, Ex: Hesperomys muriculus = Calomys callosus (Rengger), 24 Jul 1955 (BMNH). ECUADOR: Riobamba, Chimborazo Prov., elev. 2,800 m, 1 ♂, Ex: Rattus rattus (Linn.), 12 Jun 1956; Sanjapamba, Tungurahua Prov., 6 ♀, Ex: Cavia porcellus (Linn.), 1956 (BMNH). PERU: Huancabamba, elev. 1,960 m, 4 ♂, 9 ♀, Ex: Cavia cobaya (domestic) = C. porcellus, 17, 19 May 1956; Lima, 1 ♂ (holotype), 1 ♀ (Neallotype), 1 ♂, 18 ♀ (paratypes), Ex: “rats,” 1930; Yura, Arequipa Prov., elev. 8,200 ft, 1 ♀, Ex: Cavia musteloides = Galea musteloides Meyen, 8 Aug 1939 (BMNH); Yura, Arequipa Prov., elev. 8,200 ft, 1 ♀, Ex: G. musteloides (REL).

Remarks.—Hectopsylla eskeyi occurs in the higher Andean valleys on a variety of hosts and little can be said of its host specificity.

Hectopsylla gemina Jordan 1939
(Figs. 8, 15)


Remarks.—All records of this species are restricted to Argentina, the preferred host being mountain cavies (M. australis). Although this flea has not been associated with H. cypha, it parasitizes the same host species in the same general geographic region.

Hectopsylla gracilis Mahnert 1982
(Figs. 10, 21)


Remarks.—Specimens from Mendoza Province (BMNH) were not recognized as a H. gracilis until Mahnert’s description in 1982. The geographic range of the preferred host, E. morgani, is limited to Argentina and adjacent southern Chile (Wilson and Reeder 1993).
Hectopsylla knighti Traub and Gammons 1950  
(Fig. 11)  

Material examined.—México Michoacán State, Municipality of Tancítaro, Tancitami, 1 ♂ (holotype), Ex: “head of swift,” May 1940 (FMNH).

Remarks.—Additional observations of “swifts” in the region of Michoacán, México, are needed to find the males of this species and further elucidate its taxonomic status.

Hectopsylla pascuali Beaucournu and Alcover 1990  
(Figs. 9, 20)  

Material examined.—ARGENTINA: Rio Chapelco, Neuquén Province, 1 ♂ (holotype), 1 ♀ (allotype), 1 ♀ (paratype), Ex: Chelemys macronyx (Thomas), 9 Dec 1987 (JCB).

Hectopsylla psittaci Frauenfeld 1860  
(Fig. 22)  

Material examined.—ARGENTINA: 1 ♀ (lectotype), 2 ♀ (paralectotypes), Ex: Strix pelate = Tyto alba (Scopoli); Buenos Aires, 2 ♀, Ex: “owl,” 1913; Chivilcoy, Buenos Aires Province, 2 ♀, Ex: “hen,” 2 Feb 1936 (BMNH); Las Roses, (B.A.), 1 ♀, Ex: “Paloma”; Zapallar, La Rioja Prov., 3 ♀, Oct 1933 (USNM). BRAZIL: Progne, Rio de Janeiro State, 2 ♀ (USNM). CHILE: St. Jogo (Santiago de Chile), 2 ♀ (syntypes), Ex: Cyarzolycus patagonicus or Ericogna-thus leptorhynchus (King) (BMNH); Santiago, 1 ♀, 11 Sep 1951; Santiago, 2 ♀, Ex: “turtle dove” (USNM). HOLLAND: den Haag, 22 ♀, Ex: Phasianus sp. (L.), Aug 1926; Rotterdam, 4 ♀, Ex: Gallus domesticus = Gallus gallus (L.), July 1936 (BMNH); den Haag, 3 ♀, Ex: Phasianus sp., Aug 1926 (USNM). ENGLAND: London (Zoological Gardens), 3 ♀, Ex: Cittocincla macrura (sic) = Copsychus malabaricus (Swinhoe); London (Zoological Gardens), 3 ♀, Ex: “birds in western aviary”; London (Zoological Gardens) 3 ♀, Ex: Cittocincla macrura (sic) or Copsychus saularis (L.) (BMNH); London (Zoological Gardens), 2 ♀, Ex: “Cittocincla (sic) = Kito-cincla (Gould) or Copsychus” (USNM). PERU: E. Ribeyro, Lima, 1 ♂, 2 ♀, Ex: “chickens”; Hacienda Las Vegas, 30 km from Barranca City, 1 ♀, Ex: swallow “variety called Santa Rosita,” 1947 (BMNH); Cuzcon, Oconota River, elev. 3,500–4,000 m, 2 ♀, Ex: Merganetta leucogenys turneri = Merganetta armata Gould, 26 Jul 1949; Hacienda Ceapano, Cuzco Prov., 1 ♂, Ex: Colaptes rupicola pana = Colap tes rupicola d’Orbigney, 14 Aug 1950 (USNM). UNITED STATES: Oceanside, San Diego County, California, 1 ♀, Ex: Bubo virginianus pacificus = Bubo virgini-nianus (Gmelin), 7 Jun 1942 (BMNH); Oceanside, San Diego County, California, 1 ♀, Ex: B. v. pacificus, 7 Apr 1942 (USNM); Alameda (6.5 km w. Newark), California, 1 ♂, 4 ♀, Ex: cliff swallow nests, 15 Jan 1981 (REL).

Remarks.—Hectopsylla psittaci, a primary parasite of birds, is recorded from diverse areas. However, it is native to the southern cone of South America with populations dispersed to the southwestern United States by owls and other migratory bird species. Schwan et al. (1983) reported large numbers of this species from the nests of Cliff Swallows (Hirundo pyrrhronota Vieillot) and Black Phoebes [Sayornis nigricans (Swainson)] in southern California. The species likely occurs through Central America as well.

Hectopsylla stomis Jordan 1925  
(Figs. 3, 13)  

(Desmarest), 5 May 1928; El Quebrachal, Salta Prov., elev. 620 m, 2 ♀, Ex: L. maximus, 30 Jul 1940; El Ojit, Santiago del Estero Prov., elev. 620 m, 1 ♂, Ex: L. maximus, 19 Jul 1940; La Paz, Mendoza Prov., elev. 620 m, 6 ♂, 22 ♀, Ex: L. maximus, 1 Mar 1939; Puesta “pugín” Algarobito, Mendoza Prov., elev. 620 m, 4 ♀, Ex: L. maximus, 25 Jul 1959; San Rafael, Mendoza Prov., 1 ♂, Ex: M. australis, 20 Apr 1939 (BMNH). Chasícó, Buenos Aires Prov., 1 ♂, Ex: L. m. maximus, May 1968; Patagonia, 4 ♀, Ex: “Viscacha” Lagostomus sp., Sep 1962; Victoria, La Pampa Prov., 1 ♂, Ex: Rattus sp., 29 Jun 1935 (USNM).

Remarks.—Lagostomus maximus, occurring in southern Paraguay, and in northern and central Argentina is the primary host for this flea. Hectopsylla stomis has been collected throughout the year.

Hectopsylla suarezi C. Fox 1929 (Fig. 16)


Remarks.—This flea is associated with domestic guinea pigs associated with human habitations. Astute collecting may yield many more specimens than are currently known, although the wide use of DDT in human dwellings for controlling the vectors of Chagas’ disease (conenose bugs) and malaria (mosquitoes) may explain the absence of these fleas in collections after the mid-1940s.

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