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A taxonomic revision of the genus *Plocopsylla* Jordan, 1931
(Siphonaptera: Stephanocircidae)

Schramm, Beth Ann, Ph.D.
Iowa State University, 1987
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A taxonomic revision of the genus *Plocopsylla* Jordan, 1931
(Siphonaptera: Stephanociricidae)

by

Beth Ann Schramm

A Dissertation Submitted to the
Graduate Faculty in Partial Fulfillment of the
Requirements for the Degree of
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ABSTRACT

The genus *Plocopsylla* Jordan, 1831 (Siphonaptera: Stephanocircidae) is revised. A key to the 23 species is presented which includes the 11 species described since Del Ponte constructed his key in 1977. The sternite IX, movable process and clasper with its mesal process are male structures of taxonomic importance because each is species specific. There is no single character in the female that is species specific. The spermatheca of each species can be assigned to one of four morphological types and, as a result, it is of taxonomic significance only when used in conjunction with other characters. Classifying *Plocopsylla* species according to similarities of species-specific characters is important when considering the phylogeny of the genus or family. The three male characters provide the basis for the classification of species below the genus level with Species Group A consisting of four subgroups and Species Group B consisting of two subgroups. *Plocopsylla pallas* and *P. traubi* are excluded until male representatives are collected or until a useful female character is discovered. Illustrations for each species include the sternite IX, movable process and clasper of the male and the spermatheca of the female. Based on examined material, the host specificity trends of certain *Plocopsylla* species do not appear to coincide with host specificity trends within the siphonapteran order as reported by Traub (1985). Host specificity as it relates to
Plocopsylla females misidentified by Jordan (1931a, b) as *P. chiris* and *P. phobos* also is discussed. Coevolution between *Plocopsylla* and their hosts is based, in part, on coevolutionary trends of the genal and pronotal combs in the siphonapteran order as observed by Traub (1980, 1985). Stephanocircids also have helmet combs that may reflect the nature of the host pelage.

This is indicated in the research by Traub and Dunnet (1973) and in the material examined for this study. Such evidence, in conjunction with incomplete host lists, strongly indicates that rodents are the true or important hosts for *Plocopsylla* species and that marsupials and insectivores are accidental or occasional hosts.
INTRODUCTION

The subfamily Craneopsyllinae (Siphonaptera: Stephanocircidae) which includes Plocopsylla and six other genera, is limited essentially to South America. The exception is *P. scotinomi* which is known only from Panama. In contrast, the subfamily Stephanocircinae, which includes two genera, is limited to Australia. In spite of this distribution, the stephanocircids are considered to be a monophyletic group since it is interpreted that the two subfamilies exhibit too many similarities to be the result of convergent evolution (Holland 1964, Traub and Dunnet 1973). As a result, this family is frequently used as an example supporting the occurrence of continental drift.

The family Stephanocircidae is characterized by a bizarre modification of the head which gives rise to their common name of "helmeted" fleas. The head (Figs. 92, 93) is divided into an anterior helmet region with a vertical ctenidium, an occipital region, and a genal region with a ctenidium of four to seven spines. In most of the stephanocircids, there is some degree of flexibility between the helmet and the other two regions. Because of this flexibility and because of a narrowed anterior margin, the helmet supposedly functions like the prow of a boat (Mutchmor 1987) by separating host hairs as the flea moves through the host's pelage (Traub 1980). The helmet ctenidia help anchor the flea to its hosts.
There are two reasons besides zoogeography that indicate the stephanocircids are an ancient family. First, these fleas have several primitive morphological features, including the absence of a ball and socket or fulcrum for the movable process. Second, under the theory that primitive fleas are considered to be associated with primitive hosts, stephanocircids have marsupial, insectivore and rodent hosts (Traub and Dunnet 1973, Traub 1980).

The need for a revision of Plocopsylla is apparent from a review of the literature. The species described between 1909 and 1950 were based on incomplete written descriptions. The corresponding illustrations were frequently incomplete, if not inaccurate, since certain male structures of taxonomic importance can be accurately viewed only in dissected material, such dissections not having been performed for those species. Additional reasons for revising the genus involve inadequacies of the three existing species keys (Hopkins and Rothschild 1956, Johnson 1957, Del Ponte 1977), including the following: The 1956 and 1957 keys use the bristle arrangement along the posterior margin of the hind tibia as a character but this character exhibits some variation within any of the 19 species that lack a complete or incomplete false comb; the 1977 key omits _P. ulysses_ Hopkins 1951; and the 11 most recently described species, including five species in press, outdate the 1977 key and eight of these 11 species invalidate couplet 2 of the 1956 and 1957 keys.
By 1987, there were 18 species assigned to the genus *Plocopsylla* (Siphonaptera: Stephanocircidae), of which four had been described prior to Wagner's erection of the family in 1928 and Jordan's erection of the genus in 1931.

*Plocopsylla wolffsohni* was originally placed in *Stephanocircus* Skuse 1893 because of helmet similarities with the other American species in this genus. In 1909, Oudemans transferred *Stephanocircus* from the family Ctenopsyllidae Baker 1905 to the Macropsyllidae.

Rothschild (1911) erected *Craneopsylla* in the family Macropsyllidae, into which he placed all American *Stephanocircus* species, including *P. wolffsohni* and his newly described *P. achilles*. His justification was that all the American species shared certain characters, including the presence of spines on the mesal surfaces of the hind coxae.

Rothschild (1914) erected *Cleopsylla* in the Macropsyllidae. He also described *P. pallas* which he noted shared certain characters with *P. wolffsohni* and *P. achilles* that were not found in the other *Craneopsylla* species. One such character in the females was the separation of the ninth and tenth tergites by a broad suture. This opposed his earlier observation (1911) that females of all *Craneopsylla* species lacked this suture.

Although Dalla Torre (1924) placed *Cleopsylla* in the family Hystrichopsyllidae, this genus, as well as *Craneopsylla* and
Stephanocircus was later assigned by Wagner (1928) to his newly erected family Stephanocircidae. Ewing (1929) followed the classification of Dalla Torre and may have been unaware of Wagner's 1928 paper since it had appeared in a Russian publication only the previous year.

Plocopsylla chiris was described by Jordan (1931a) and was originally placed in Craneopsylla. He observed that the species assigned to Craneopsylla could be divided readily into three groups which he interpreted as either three genera, each with several species, or three species, each with several subspecies. That same year, Jordan (1931b) described some fleas from Ecuador including five stephanocircids. This additional material indicated that the species previously assigned to Craneopsylla actually belonged in three separate genera. To accommodate these species, he erected Plocopsylla and Sphinctopsylla. Differences among these three genera include the placement of the two long bristles on the gena, the shape of the spermatheca and the presence or absence of an apical fringe of long bristles on the fixed process.

Jordan specifically proposed Plocopsylla for P. hector and P. phobos from the Ecuadorian material, as well as for P. wolffsohni, P. pallas and P. achilles included in section A of a Craneopsylla key by Rothschild (1914). He designated P. achilles as the type species. No mention was made of P. chiris, which apparently remained in Craneopsylla.

In 1933, P. enderleini and P. heros were described. Wagner
(1937) listed *P. chiris* as a member of *Plocopsylla*. But it is difficult to determine whether this species was transferred from *Craneopsylla* on or before 1937. In any case, *Plocopsylla* was recognized by Jordan (1931b), while *P. chiris* was described in Jordan (1931a) as *Craneopsylla chiris*.

In the late 1930s and 1940s, the family *Stephanociricidae* was considered variously as a family, subfamily and a synonym of the *Macropsyllidae*. Wagner (1936) maintained its familial status, while Beier (1937) demoted it to the *Stephanocircinae*, one of four subfamilies in the family *Ceratophyllidae*. He further subdivided the *Stephanocircinae* into three tribes, with the *Cleopsyllini* and the *Coryopsyllini* containing *Cleopsylla* and *Coryopsylla*, respectively, while the *Stephanocircini* included *Plocopsylla*, *Stephanocircus*, *Craneopsylla* and *Sphinctopsylla*.

Wagner retained his earlier classification (1928) by erecting the genera *Tiarapsylla* (1937) and *Nonnapsylla* (1938) in the family *Stephanociricidae*.

Early attempts at classifying Siphonaptera into a relatively few families (Baker, 1905; Wagner, 1927 [sic]; Ewing, 1929) were dismissed by Kishida (1939) as "inconsistent and inconvenient." He recognized 19 families in the suborders *Fracticipita* and *Integricipita* as established by Oudemans (1908). He designated *Macropsylla* as the type genus for the family *Macropsyllidae* and *Craneopsylla* as the type genus for his new family *Craneopsyllidae*. Kishida separated these two families by the presence of a "spiral crown" on the frons in the *Craneopsyllidae*.
which included Plocopsylla.

Wagner (1938) erected three subfamilies for the seven stephanocircid genera. The Cleopsyllinae was synonymous with the tribe Cleopsyllini (Beier 1937) and included Cleopsylla. The Stephanocircinae was represented by Stephanocircus, and the Craneopsyllinae included Plocopsylla, Sphinctopsylla, Craneopsylla, Nonnapsylla and Tiarapsylla.

Hopkins (1960) reported that Kishida's (1939) paper was unknown outside the Far East until E. W. Jameson discovered it and sent him a copy. Hopkins felt it was unfortunate that Kishida's paper had priority since Wagner's (1939) paper was much better known and of higher quality.

In their study of fleas from Argentina, Del Ponte and Riesel (1938) placed Craneopsylla and Sphinctopsylla in the Macropsyllidae. Either they did not acknowledge the family Stephanocircidae or they were unaware of any of the representatives that they did acknowledge as having been collected in Argentina. The former explanation seems more likely, since P. chiris was collected from Argentina in 1931 and transferred to Plocopsylla on or before 1937 (Wagner 1937).

Confusion involving the classification of the stephanocircid genera continued during the 1940s. Ewing and Fox (1943) listed three Neotropical and two Australian genera in the family Stephanocircidae, although they were not specifically named. But even if Cleopsylla were placed in the Hystrichopsyllidae as in previous papers (Dalla Torre, 1924; Ewing, 1929), there was still
one less genus in Ewing and Fox's (1943) paper than the seven listed by Wagner (1939). Costa Lima (1943) listed Cleopsylla in the Hystrichopsyllidae and also acknowledged the Stephanocircidae as a synonym for the Macropsyllidae. In 1946, Costa Lima and Hathaway placed the seven stephanocircid genera including Cleopsylla into the three subfamilies erected by Wagner in 1939.

Two Plocopsyilla keys were constructed and several Plocopsylla species were described during the 1950s. Hopkins (1951) described P. ulysses and Smit (1953) described P. phyllisae. Jordan (1953) erected the stephanocircid tribe Barreropsyllini for his newly described Barreropsylla excelsa.

In spite of unique features such as a horizontal pronotal comb, it was placed in Craneopsyllinae because of similarities such as the presence of spiniform bristles on the inner surfaces of the hind coxae.

Hopkins and Rothschild (1956) recognized only the two subfamilies of Craneopsyllinae and Stephanocircinae with Cleopsylla placed in the former. They noted that Wagner (1939) placed Cleopsylla in a third subfamily because of the strong development of the submarginal bristles of the frons, which distinguished it from the other genera, and because all the genera except Cleopsylla had sutures separating the helmets from the remainder of the head capsule. According to Hopkins and Rothschild, the presence of Tiarapsylla with intermediate features for both characters indicated there was no justification in isolating Cleopsylla in a third subfamily. They also
constructed the first Key to the 10 species of *Plocopsylla*.

Johnson (1957) also recognized the two subfamilies of
Craneopsyllinae and Stephanocircinae and constructed a Key that
included her newly described *P. thor* and *P. inti*.

Hopkins (1958) noted that Cleopsyllinae had priority over
Craneopsyllinae, although *Cleopsylla* was placed in the latter
subfamily. The latter classification is generally accepted
because it appeared in the definitive works by Hopkins and
Rothschild (1958) and Johnson (1957).

Since 1957, 11 *Plocopsylla* species, including five in press,
and one stephanocircid genus have been added, and a third
*Plocopsylla* Key has been constructed. Tipton and Mendez (1966)
described *P. scotinomi*, and Del Ponte (1968) described *P. trabi*.
In 1973, Traub and Dunnet erected the monotypic genus
*Coronapsylla* in the subfamily Stephanocircinae. Del Ponte (1977)
published a key that included only 13 species, omitting *P.
ulysses* Hopkins 1951. The remaining species include *P. fuegina*
Beaucournu and Gallardo 1979, *P. reigi* Beaucournu and Gallardo
and Launay 1986, *P. lewisi* Beaucournu and Gallardo 1987 (in
press), *P. athena* Schramm and Lewis 1987 (in press), *P. Kilya*
Schramm and Lewis 1987 (in press), *P. nungui* Schramm and Lewis
1987 (in press) and *P. viracocha* Schramm and Lewis 1987 (in
press).
Classification of *Plocopsyila* species below the genus level provides necessary data for any phylogenetic study of the genus or family. Previously, *Plocopsyila* species were grouped by the total number of spines in their genital combs. This character is not satisfactory since no other character assigned the species to similar groups. However, these species may be classified using the three species-specific male characters, including the movable process, st. IX and the clasper with its mesal process. The resulting classification consists of Species Group A with four subgroups and Species Group B with two subgroups. Because no correlation could be found with female characters, *P. pallas* and *P. traubi* are excluded until male representatives are collected or until a useful female character is discovered. The lists of species in their respective subgroups are as follows:

**Species Group A**

Subgroup A-1
- *P. achilles*
- *P. hector*
- *P. heros*
- *P. kilya*
- *P. nungui*
- *P. Phobos*
- *P. Phy11isae*
- *P. scotinomi*
- *P. thor*
- *P. Ulysses*

Subgroup A-2
- *P. angusticeps*
- *P. lewisi*

Subgroup A-3
- *P. enderleinii*
- *P. viracocha*

Subgroup A-4
- *P. inti*

**Species Group B**

Subgroup B-1
- *P. athena*
- *P. chiris*
- *P. fuegina*
- *P. reigi*
- *P. wolffsohni*

Subgroup B-2
- *P. diana*
Movable Process (Figs. 87, 88)

The taxa of Species Group A have movable processes with a number of shared characters. These features include the following:

- triangular shape
- dorsalmost point at dorsal apex
- ventral margin concave or straight, lacking any minute scalloping
- single spiniform bristle at, or slightly above, caudo-ventral angle, projects posteriorly beyond membranous posterior margin of lateral surface
- mesal surface and posterior margin of distal end with scattered bristles, with lengths and positions fairly constant for a given species
- minute mesal bristles on dorsal condyle
- anterior and posterior margins of dorsal condyle variable

Subgroup A-1 includes P. achilles, P. hector, P. heros, P. phobos, P. phyllisae, P. scotinomi, P. thor, P. ulysses, P. Kilva and P. nungui, which exhibit the following additional characters involving the movable process:

- length from proximal end of movable process to distal margin of dorsal condyle roughly two-thirds length of entire structure
- dorsal apex tapers gently or abruptly
- posterior margin between dorsal apex and caudo-ventral angle vertical, convex or with pronounced posterior angle at midpoint
- spiniform bristle large relative to entire structure, with apex usually projecting ventrally
- longest bristles either along upper posterior margin or on mesal surface of distal end, with lengths and positions fairly constant for a given species
- anterior and posterior margins of dorsal condyle at least slightly concave, excluding *P. hector*

Members of Subgroup A-2 include *P. angusticeps* and *P. lewisi*. The following additional characters involving the movable process are present:

- length from proximal end of movable process to distal margin of dorsal condyle roughly one-half length of entire structure
- dorsal apex prominent, tapered gently
- posterior margin vertical or convex near apex
- posterior extension armed with small bristles located outside of or dorsal to spiniform bristle at caudo-ventral angle
- apex of spiniform bristle blunt or hooked dorsally
- longest bristles along posterior margin, with lengths and positions fairly constant for a given species
- anterior and posterior margins of dorsal condyle
  strongly concave

*Plocopsylla enderleini* and *P. viracocha* belong in Subgroup A-3 and exhibit these additional features involving the movable process:
- broadly triangular, with length from proximal end of movable process to distal margin of dorsal condyle less than one-half length of entire structure
- dorsal apex either tapered abruptly or rounded off
- posterior margin mostly, if not entirely, convex
- submarginal, spiniform bristle relatively small compared to entire structure
- extremely long bristles on mesal surface, extending beyond dorsal margin between condyle and dorsal apex, with lengths and positions fairly constant for a given species
- small mesal bristles on dorsal condyle
- dorsal condyle slants anteriorly in *P. enderleini*, posteriorly in *P. viracocha*

*Plocopsylla inti* is the sole member of Subgroup A-4. It has the following additional characters involving the movable process:
- dorsal apex tapers abruptly, asymmetrically
- dorsal apex and blunt posterior angle midway along
posterior margin both projecting dorsally, separated by deep, narrow notch

- spiniform bristle small relative to entire structure, with apex of spiniform bristle projecting ventrally
- scattered mesal bristles on posterior margin of dorsal apex

Taxa assigned to Species Group B exhibit the following combination of characters involving the movable process:

- elongate, with proximal end knoblike, curving dorsally, with distal end curving ventrally
- dorsalmost point is winglike process approximately one-third of length from distal end
- ventral margin mostly convex or with prominent midventral bulge, always with minute scalloping at midpoint
- two prominent, usually bifid, spiniform bristles, one apical and one ventral opposite dorsal winglike process
- scattered mesal bristles between dorsal condyle and ventral spiniform bristle, on lateral surface of dorsal winglike process, and on margin below ventral spiniform bristle, with lengths and positions fairly constant for a given species
- minute mesal bristles grouped on dorsal condyle
- dorsal condyle broad due to slanting margins
Based on the movable process, there is one major difference separating the two subgroups of Species Group B. Members of Subgroup B-1 are *P. chiris, P. fuegina, P. reigi, P. wolffsohnii* and *P. athena*. They exhibit the following:

- ventral margin preceding ventral spiniform bristle
evenly convex, with ventral margin straight or gently concave between two spiniform bristles

*Plocopsyilla diana*, the sole member of Subgroup B-2, has a movable process that contrasts in the following way:

- ventral margin preceding ventral spiniform bristle
essentially convex, with prominent bulge at midpoint,
with ventral margin strongly concave between spiniform bristles

**Sternite IX (Figs. 87, 88)**

There are several characters of st. IX that are common among the taxa assigned to Species Group A. These include the following:

- proximal and distal arms similar in width, and
  usually in length
- proximal arm usually with undulating posterior margin,
or with pronounced curve at midpoint, excluding
  *P. phobos*
- region where proximal and distal arms join forms
tapered ventral apex below distal arm, excluding *P. inti*.
P. enderleini, P. viracocha, P. lewisi, P. angusticeps

- usually two spiniform bristles on distal arm, excluding
  P. angusticeps, P. lewisi, P. thor, but never four that
  are usually grouped in pairs

Taxa of Subgroup A-1 include P. achilles, P. hector, P. heros, P. phobos, P. phyllisae, P. scotinomi, P. thor, P. ulysses, P. Kilya and P. nungui. They exhibit the following
characters involving st. IX:

- membranous mesal lobe below base of proximal arm,
  difficult to see in whole mount
- junction between proximal and distal arms forming
  V-shape with tapered apex below distal arm
- two spiniform bristles on distal arm, excluding P.
  thor, with lower spiniform bristle much longer than
  upper spiniform bristle
- apex of dorsal arm straight, with several hairlike
  bristles, with lengths and positions fairly constant
  for a given species
- base of spiniform bristles usually overlapped by
  membranous posterior margin of lateral surface

Taxa of Subgroup A-2 include P. angusticeps and P. lewisi.

They share the following combination of st. IX features:

- membranous, mesal lobe below base of proximal arm
  either small or absent
- Junction between proximal and distal arms with ventral apex knoblike
- Either one unsclerotized spiniform bristle midway to apex of distal arm or three spiniform bristles midway to apex with distalmost spiniform bristle unsclerotized
- Apex of distal arm straight, with variable number of small spiniform bristles and one hairlike subapical bristle, with lengths and positions relatively constant for a given species
- Bases of spiniform bristle midway to apex of distal arm may be overlapped by membranous posterior margin of lateral surface

*Plocopsylla enderleini* and *P. viracocha* are assigned to Subgroup A-3 and exhibit these additional st. IX characters:
- Lacks membranous mesal lobe below base of proximal arm
- Entire structure U-shaped due to pronounced curve at midpoint of proximal arm, with ventral apex below distal arm somewhat blunt
- Two well-separated spiniform bristles at or near curved apex of distal arm, with lower spiniform bristle noticeably longer than upper one
- Apex of distal arm curved, with several long, hairlike bristles, with lengths and positions fairly constant for a given species
- spiniform bristles may be overlapped by membranous posterior margin of lateral surface

Subgroup A-4 includes *P. inti* which exhibits the following additional characters involving st. IX:

- proximal arm with pronounced curve, much longer than distal arm
- lacks membranous mesal lobe below base of proximal arm
- junction between proximal and distal arms with blunt ventral apex
- distal arm with one pair of close-set spiniform bristles midway to apex
- apex of distal arm with pronounced posterior lobe just distad of upper spiniform bristle
- minute, lateral, hairlike bristles at posterior margin of apical lobe of distal arm of st. IX

Taxa of Species Group B exhibit the following st. IX characters:

- proximal arm always thicker and usually much longer than distal arm
- proximal arm with posterior margin fairly straight
- region broad where proximal and distal arms join, with ventral margin blunt or squared, excluding *P. athena*
- four spiniform bristles on distal arm, lower pair always similarly tapered and located midway to apex, upper pair subapical, also similarly tapered, not paired in *P. diana*.

The Subgroup B-1 members are *P. chiris*, *P. fuegina*, *P. regia*, *P. wolffsohnii* and *P. athena* and share several additional features involving st. IX:

- proximal arm usually much longer than distal arm
- dorsal angle between proximal and distal arms acute
- two pairs of spiniform bristles on distal arm, lower pair of similar bristles midway to apex, upper two also paired, similar to each other

*Plocopsylla diana* of Subgroup B-2 can be distinguished by the following combination of st. IX features:

- proximal and distal arms similar in size
- dorsal angle between proximal and distal arm wide, almost forming right angle
- four spiniform bristles on distal arm, lower two paired midway to apex and similar to each other, upper two also similar to each other but well separated
Clasper (Figs. 87, 88)

Taxa placed in Species Group A exhibit a number of shared characters involving the clasper, including:

- fixed process narrow, with apex narrow or expanded
- well-developed midventrual, knoblike process, excluding P. inti and P. enderleini
- at best, only apical tip of manubrium curved dorsally, excluding P. inti
- angle formed by t. IX and manubrium usually rounded, excluding P. heros and P. enderleini, always oriented anteriorly
- usually without lobe on fixed process, but if present, then on dorsal margin preceding apical fringe or on mesal surface with hairlike apical bristle
- mesal process variable

Members of Subgroup A-1 are P. achilles, P. hector, P. heros, P. phobos, P. phyllisae, P. scotinomi, P. thor, P. ulysses, P. kilya and P. nungui. They share the following additional characters involving the clasper:

- manubrium and t. IX similar in size
- fixed process and apex both narrow
- absence of any lobe on fixed process
- angle formed by t. IX and manubrium rounded, excluding P. heros
- mesal process variable, usually with well-sclerotized, rectangular, dorsal region and membranous, ventral lobe at proximal end, excluding P. hector, P. kilia and P. scotinomi

Taxa belonging to Subgroup A-2 include P. angusticeps and P. lewisi. Additional clasper characters for this group include:

- manubrium elongate, larger than t. IX
- fixed process narrow, with apex expanded and apical margin strongly convex
- narrow mesal lobe with hairlike apical bristle
- angle formed by t. IX and manubrium extremely wide, oriented anteriorly
- mesal process variable

Plocopsylla enderleini and P. viracocha are in Subgroup A-3 and share these additional features involving the clasper:

- fixed process and apex both narrow
- dorsal lobe preceding apical fringe in P. enderleini, lacking in P. viracocha
- angle formed by t. IX and manubrium narrow in P. enderleini, wide in P. viracocha
- mesal process broad, with constriction anterior to expanded distal end
The sola member of Subgroup A-4 is P. inti, which has the following additional features involving the clasper:

- manubrium and t. IX both extremely elongate
- fixed process and apex both narrow
- dorsal lobe preceding and well separated from fringe on fixed process
- angle formed by t. IX and manubrium extremely wide, oriented anteriorly
- mesal process appears broadly U-shaped in illustration by Johnson (1957)

Taxa placed in Species Group B have several features in common involving the clasper, including:

- fixed process broad, excluding P. diana, with ventral margin strongly concave
- midventral knoblike process reduced
- proximal end of manubrium curves dorsally
- angle formed by t. IX and manubrium somewhat rectangular, oriented somewhat dorsally
- fixed process may have dorsal lobe anterior to apical fringe or mesal lobe near dorso-apical fringe, P. chiris with two connected mesal lobes
- mesal process with sclerotized dorsal region curved, with dorsal extensions usually at proximal and distal ends, with membranous midventral lobe
Members of Subgroup B-1 include P. chiris, P. fuegina, P. reigi, P. wolffsohni and P. athena. They exhibit these characters involving the clasper:

- fixed process broad, with apex blunt
- if lobe on fixed process, then on dorsal margin anterior to apical fringe or on mesal surface overlapped by dorsalmost bristles of apical fringe, with P. chiris having two connected mesal lobes
- sclerotized dorsal portion of mesal process slender, curved, with dorsal extensions at proximal and possibly distal ends, with membranous, midventral lobe

In contrast, P. diana of Subgroup B-2 has the following combination of features involving the clasper:

- fixed process narrow due to concave ventral margin
- broad mesal lobe on fixed process extending beyond dorso-apical margin of fixed process
- sclerotized dorsal portion of mesal process rectangular, relatively thick, curved, apparently with membranous lobe at proximal end
KEY TO THE SPECIES OF PLOCOPSYLLA

Females assigned to P. chiria are questionable for reasons that are discussed in the section on host specificity. They key out to females of P. lewisi but can be distinguished by the character difference mentioned in couplet 19.

1 - At most 4 spines in genal comb, none on genal lobe .... 2

- From 5 to 7 spines in genal comb, with uppermost spines on genal lobe .................................................. 10

2 - Dorso-marginal bristles of hind tibia forming complete
   or incomplete false comb ..................................... 3

   - Dorso-marginal bristles not forming false comb ........... 6

3 - False comb complete ........................................... 4

   - False comb incomplete ...................................... 5

4 - Prectenidial helmet width roughly equal to or greater than
   length of longest helmet spine; both sexes usually
   lacking submarginal bristles along anterior margin of gena;
   antepygidial bristle of male similar in length to broad
   mesal process on clasper; female with anal stylet
   cylindrical, 4x as long as its basal width ............ hector

   - Prectenidial width of helmet much shorter than length of
longest helmet spine; both sexes usually with 1 to 5 submarginal bristles along anterior margin of gena; short antepygidal bristle of male less than one-half length of elongate mesal process of clasper; female with anal stylet tapered, at most 3x as long as its basal width .... *Kilya*

5 - Pronotal comb of 18 to 20 spines; usually with 4 or 5 submarginal bristles along anterior margin of gena and with 1 to 4 small bristles between 2 long genal bristles; male with 1 long antepygidal bristle and 1 tiny accessory bristle per side, both on pedestal; female with variable number of antepygidal bristles per side, allotype and others with 4, but 2 or 3 not uncommon; hilla of spermatheca usually broadest at midpoint .... *Ulysses*

* - Pronotal comb of 14 to 16 spines; without submarginal bristles along anterior margin of gena and usually with 4 or 5 small bristles between 2 long genal bristles; male with 1 antepygidal bristle per side, slightly shorter than accessory bristles; female with 2 antepygidal bristles per side, with hilla of spermatheca of uniform width .........

................................................. *Scotinomis*

6 - Genal comb spines short, length not much greater than width; 1 to 4 spines in genal comb; male with 1 tiny accessory bristle per side, much shorter than hairlike
accessory bristle; female with 2 short antepygidal bristles per side, with length, at most, 1.5x length of accessory bristle ........................................ Phyl1isae

- With 4 spines of normal length in genal comb, at least 2x as long as wide ............................................ 7

7 - Anterior margin of gena blunt, at best, upper one-half convex; male with 1 long antepygidal bristle per side, lacking accessory bristles; female with 3 antepygidal bristles per side ......................... nungui

- Anterior margin of gena with upper one-half convex, lower one-half concave, cephalo-ventral angle may be prominent and knoblike; male with 1 short antepygidal bristle per side; may be longer or shorter than hairlike accessory bristle; female with 2 antepygidal bristles per side .. 8

8 - Male with distal arm of st. IX having lowest spiniform bristle wedge shaped; female usually with 0 to 3 submarginal bristles along anterior margin of gena and 2 small bristles between 2 long genal bristles, with anal stylet usually 3 to 4x as long as its basal width .... thor

- Male with distal arm of st. IX having lowest spiniform bristle either extremely elongate and tapered or somewhat
elongate, with apex abruptly tapered; female usually with 4 to 6 submarginal bristles along anterior margin of gena, usually with 2 to 4 small bristles between 2 long genal bristles, with anal stylet usually 2.5 to 4x as long as its basal width ........................................... 9

9 - Male with prominent posterior extension on t. VIII. with lowest spiniform bristle on distal arm of st. IX elongate and tapered, roughly one-third length of distal arm; female with anal stylet usually 2.5 to 3x as long as its basal width ........................................... heros

- Male without prominent posterior extension on t. VIII. with lowest spiniform bristle on distal arm of st. IX of uniform width with apex pointed, at most, one-fourth length of distal arm; female with anal stylet elongate, usually 3 to 4x as long as its basal width .............. phobos

10- Genal spine, at most, roughly one-half length of adjacent spine in comb ................................................. 11

- Genal spine slightly shorter than adjacent spine in comb ......................................................... 14

11 - Pretenidal width of helmet more than 1.5x greater than length of longest helmet spine; preoral tuber elongate.
with basal length 1.5 to 2x greater than height at midpoint; male without dorsal lobe preceding fringe on clasper, with apex of distal arm of st. IX curved, (males of P. pallas unknown); female with 3 or 4 long, well-separated bristles below lobe on posterior margin of t. VIII .......... 12

- Prectenidial width of helmet less than 1.5x length of longest helmet spine; preoral tuber campanulate, with height at midpoint and basal length roughly the same; male with dorsal lobe preceding fringe on clasper or with apex of distal arm of st. IX straight; female with 2 pairs of medium-length bristles or 5 to 6 long bristles in a row below lobe on posterior margin of t. VIII ............. 13

12 - Prectenidial width of helmet more than 2x length of longest helmet spine; lowest of 3 bristles in fourth to sixth dorsal notches from proximal end of hind tibia separated from other 2 by a gap usually less than basal width of lowest bristle; male unknown; female with 4 long, well-separated bristles below lobe on posterior margin of t. VIII, spermatheca with hilla noticeably shorter than bulga.
........................................................................................................ pallas

- Prectenidial width of helmet more than 1.5x but less than 2x length of longest helmet spine; lowest of 3 bristles in fourth to sixth dorsal notches from proximal end of hind
tibia separated from other 2 bristles by a gap equal to or greater than basal width of lowest bristle; male, with 2 spiniform bristles on distal arm of st. IX, lower long and wide, upper roughly one-half as long but nearly as wide; female with 3 long, well-separated bristles below lobe on posterior margin of t. VIII, spermatheca with hilla slightly shorter than bulga ................. viracocha

13 - Helmet spines notched basally; 5 spines in genal comb; male without dorsal lobe preceding fringe on clasper, with apex of distal arm of st. IX straight; female with 2 pairs of bristles below lobe on posterior margin of t. VIII, dorsal anal lobe with long bristle set well above apex of ventro-lateral extension ....... achilles

- Helmet spines not notched basally; 6 spines in genal comb; male with prominent dorsal lobe preceding fringe on clasper, with apex of distal arm of st. IX curved; female with a row of 5 or 6 long bristles below lobe on posterior margin of t. VIII, dorsal anal lobe with long bristle at apex of ventro-lateral extension ...........

................................. enderleini

14 - With 7 spines in genal comb; male with a gap separating dorsal lobe on clasper well separated from fringe of bristles; female with 1 antepygidal bristle per side ...
- With 5 spines in genal comb ....................... 15

15 - Anterior margin of helmet concave; male with narrow mesal lobe with hairlike apical bristle on fixed process of clasper; female unknown ...................... angusticeps

- Anterior margin of helmet convex ..................... 16

16 - With 18 to 20 helmet spines; male with 1 flattened antepygidal bristle and 1 small, stout accessory bristle per side, both on pedestal; spermatheca of female without hillia penetrating into elongate bulga ........... diana

- At most 17 helmet spines .................................. 17

17 - Gap isolating genal spine from adjacent spine in comb at least 1.5x greater than basal width of genal spine .... 18

- Gap isolating genal spine from adjacent spine in comb at most slightly wider than basal width of genal spine .. 19

18 - Male with distal arm of st. IX having 2 angled, tapered spiniform bristles at midpoint and 2 smaller, blunt spiniform bristles near apex; female either lacks notch
below lobe on posterior margin of t. VIII with several long bristles located at caudo-ventral angle or, lower margin of lobe curves downward before meeting ventral margin of t. VIII with several long bristles crowded along curved region ....................... fuegina

- Male unknown; female with rectangular notch below lobe on the posterior margin of t. VIII, bristles arising from middle of notch ....................... traubi

19 - Helmet spines with, at most, shallow basal notches; male with triangular movable process with 1 spiniform bristle near caudo-ventral angle, st. IX with 3 spiniform bristles midway to apex, upper one unsclerotized; female with 2 lobes on lower one-half of posterior margin of t. VIII with roughly 4 long bristles on smaller, more ventral lobe (females assigned to P. chiris can be distinguished by having several long bristles along notch below single prominent lobe on lower one-half of posterior margin of t. VIII); females of both species with long bristle set well above apex of ventro-lateral extension of dorsal anal lobe ....................... lewisii

- Helmet spines with prominent V-shaped basal notches; males with elongate movable process with 2 spiniform bristles, with 2 pairs of spiniform bristles on distal arm of st. IX;
dorsal anal lobe of female with long bristle at apex of ventro-lateral extension .............................. 20

20 - Prectenidial width of helmet much shorter than length of longest helmet spine ........................................... 21

- Prectenidial width of helmet similar to length of longest helmet spines ..................................................... 22

21 - Male clasper with small dorsal lobe with apical bristle preceding apical fringe, and connected to blunt mesal lobe overlapped by dorso-apical bristles of fringe; 3 medium-length bristles preceding ventral spiniform on movable process; female unknown ................... chiris

- Male clasper without dorsal or mesal lobe; 2 short, hairlike bristles preceding ventral spiniform bristle on movable process; anal stylet of female slightly tapered, 2 as long as its basal width ......................... athena

22 - Gap separating genal spine from adjacent spine in comb usually less than one-half basal width of genal spine; male clasper with dorsal lobe preceding fringe of bristles, with deep notch between distal arm of st. IX and ventral margin; female with anal stylet usually tapered, usually 2.5 to 3 as long as its basal width but always more than 2x
as long ........................................ wolffsohn i

- Gap separating genal spine from adjacent spine in comb always more than one-half basal width of genal spine; male clasper without dorsal lobe preceding fringe of bristles, without deep notch between distal arm of st. IX and ventral margin; female with anal stylet stout, usually about 2x as long as its basal width .......................... regi
SYSTEMATIC ACCOUNT

Genus Plocopsylla Jordan, 1891b

(Type species by designation: Craneopsylla achilles Rothschild, 1911).


The Family Stephanocircidae includes the Central and South American subfamily Craneopsyllinae with a helmet suture that is vestigial or merges with the interantennal suture and the Australian subfamily Stephanocircinae with a well-developed helmet suture. Within the Craneopsyllinae, the tribe Barreropsyllini has a horizontal pronotal comb and the tribe Craneopsyllini has a vertical pronotal comb. Of the genera belonging to Craneopsyllinae, Plocopsylla is most similar to Craneopsylla and Sphinctopsylla, all of which have the helmet completely divided from the remainder of the head and have only a few mesal bristles on the prothoracic coxae. Plocopsylla is distinguished by having both genal bristles anterior to the cibarial pump instead of being in line with the cibarial pump as in Craneopsylla, or one bristle located posteriorly as in Sphinctopsylla. In Plocopsylla, the male has a clasper with an apical fringe of very long bristles on the fixed process and t. VIII has an apodeme. In contrast, an apical fringe of long
bristles and an apodeme are lacking in males of both *Craneopsylla* and *Sphinctopsylla*. Females of *Plocopsylla* have a barrel-shaped spermatheca which lacks both an internal tubercle and a basally-enlarged hilla. In contrast, females of *Craneopsylla* have a spermatheca with a large internal tubercle and females of *Sphinctopsylla* have a spermatheca with a basally-enlarged hilla.

**Plocopsylla achilles** (Rothschild, 1911)
(Figs. 1-4)

*Craneopsylla achilles*. Rothschild, 1911, Novitates Zoologicae. 181:117-122, fig. 4.


Diagnosis. *Plocopsylla achilles* can be distinguished from all other species with five spines in the genal comb by the presence of a genal spine that is, at most, one-half the length of the adjacent spine in that comb.

Description. **HEAD.** Prectenidial width of helmet roughly equal to length of longest helmet spine. Helmet striations often
fused posteriorly into groups of four to six, occasionally with anterior ends expanded. Usually 13 or 14 basally-notched helmet spines. Anterior margin of gena with upper one-half convex, lower one-half slightly concave. Both sexes usually with four to seven submarginal bristles along upper anterior margin of gena. Both sexes usually with two to five smaller lateral bristles between two long genal bristles. Genal comb contains five spines, with genal spine, at most, one-half length of adjacent spine in comb, separated by a gap greater than basal width of genal spine. Genal lobe expanded distally, slightly rounded. Preoral tuber campanulate, with ventral margin notched, slanted. Antennal bristles usually arise along concave distal margin of second antennal segment, with longest bristles usually reaching apex of clava. THORAX. Pronotum with two rows of bristles, with anterior row of intermediate-length bristles, posterior row of alternating long bristles and intercalaries. Pronotal comb usually with 16 to 18 spines, with narrow lobe below ventralmost spine over one-half length of that spine. Meso- and metanotum each with two rows of bristles, similar to those of pronotum. Usually two or three mesonotal pseudosetae per side. LEGS. Dorsal notches of hind tibia generally with the following bristle arrangement: 3-2-2-3-3-3-3. Lateral surface of hind tibia with variable bristle arrangement. ABDOMEN. Tergites each with two rows of bristles, similar to those of pronotum, with anterior row rudimentary or lacking in posterior tergites of male. Marginal spinelets of anterior tergites of male: I 2-5/3-5, II 1-3/1-3.

Sternites II-VI each with several bristles in a row per side, better developed in female. Sternite VII and t. VIII of female with scattered bristles of varying lengths. Male with one antepygidial bristle and one hair-like accessory bristle per side, with antepygidial bristle less than 2x length of accessory bristle. Female with two long antepygidial bristles per side.

**MODIFIED ABDOMINAL SEGMENTS OF MALE (Figs. 2-4).**

Subsensilial sclerite with long apical bristle, slightly narrower than antepygidial bristle. Proximal arm of st. IX slender, with pronounced curve at midpoint, with membranous mesial lobe below base of arm. Distal arm of st. IX with lower spiniform bristle elongate and blunt, roughly 4 to 5x longer than blunt, upper spiniform bristle. Fixed process with apical fringe usually of 13 or 14 large bristles, with gaps frequently separating fifth, sixth and seventh bristles, with smaller lateral and marginal bristles near fringe. Mesal process with dorsal region elongate, rectangular, visible in whole mount due to sclerotization, with membranous ventral lobe at proximal end, visible in dissected material. Movable process triangular, with submarginal spiniform bristle projecting beyond membranous outer margin at caudo-ventral angle. Certain features involving movable process, st. IX and clasper place *P. achilles* in Subgroup A-1 of Species Group A. Aedeagal apodeme elongate, with proximal end blunt, and neck region constricted and curved. Aedeagal pouch with ventral
margin smooth. Sclerotized inner tube slightly broader at base, curving at midpoint roughly 45 degrees.

**MODIFIED ABDOMINAL SEGMENTS OF FEMALE (Fig. 1).** Dorsal anal lobe with one tiny and several long bristles per side, lowest long bristle situated well above apex of elongate ventro-lateral extension. Spermatheca with deep penetration of hilla into reniform bulga. Hilla broadest toward anterior end, with hilla usually similar in length to bulga. Anal stylet 2.5 to 3x as long as its basal width.

**LENGTH.** Male 2.0 mm, female 3.0 mm.

**Type Material**
Ecuador:

**Additional Material**
Ecuador:
Ibid., except ex. *Oryzomys* sp., IF, (BM).
Papallacta, 1.4 km E, Napo Province, 3040m, ex. *Thomasomys erro*, 3-V-80, leg. R. S. Voss, IF, (VJT).
Papallacta, 6.2 km W, Napo Province, 3600m, ex. *Thomasomys paramorum*, 3-V-80, leg. R. S. Voss, 4M 2F, (VJT).
Ibid., except ex. *Thomasomys* sp. (nr. caudivarius), 1M 3F, (VJT).
Papallacta, 7.5 km W, 3680m, ex. *Thomasomys* sp. (nr. caudivarius), 3-V-80, leg. R. S. Voss, 3M 4F, (VJT).
Ibid., except 3600m, ex. *Akodon mollis altorum*, IF, (VJT).
Vicinity of Papallacta, ex. *Thomasomys* sp. (nr. caudivarius***), 5M 3F, (VJT).
*Original description places Chota in Ecuador. Only known Chota is in Peru.*

**Mandlangara could not be found in association with any Central or South American country. It is assumed to be in Ecuador since all other material for *P. achilias* is from that country, with the possible exception of Chota.**

***The host was listed as *Thomasonmys* "hylophilus" by Robert Voss but he stated that as this was a new species it should probably be cited as *Thomasonmys* (nr. caudivarius).***

**Host Synonymy**

*Thomasonmys caudivarius* = ?

**Plocopsylla angusticeps** Mahnert, 1982

(Figs. 7-9)


**Diagnosis.** *Plocopsylla angusticeps* is appropriately named for its extremely narrow helmet with a concave anterior margin which distinguishes it from all other species. Female unknown.

**Description of holotype male.** HEAD. Prepteridial width of helmet at most one-half length of longest helmet spine. Short helmet striations in upper one-fourth of prepteridial area, no evidence of anastomosing. Helmet spines not basally notched, with 11 spines on left side, 12 on right. Anterior margin of gena blunt, with 14 submarginal bristles. With 11 smaller lateral bristles between two long genal bristles. Genal comb of five spines, with genal spine tapered, slightly shorter than adjacent spine in comb, separated by a gap narrower than basal width of genal spine. Genal lobe truncate, with slight distal
expansion. Preoral tuber with height at midpoint 2x the basal length, with small projection along posterior margin. Antennal bristles arise along concave distal margin of second segment, with longest bristles almost reaching apex of clava. THORAX. Pronotum with three rows of bristles, with first two rows of intermediate-length bristles, third row of alternating long bristles and intercalaries. Pronotal comb of 24 spines. Meso- and metanotum each with three rows of bristles, similar to those of pronotum. With two mesonotal pseudosetae per side. LEGS. Dorsal notches of hind tibia with the following bristle arrangement: 3-2-3-4-4-4-4. Lateral surface of hind tibia with row of bristles that broadens distally into two rows. ABDOMEN. Tergites with two rows of bristles, with anterior row of intermediate-length bristles, posterior row of alternating long bristles and intercalaries. Anterior row reduced on t. IV-VII. Marginal spinelets of anterior tergites of holotype: I 3/4, II 3/4, III 4/3, IV 3/2. One elongate antepygidial bristle per side, without accessory bristle.

MODIFIED ABDOMINAL SEGMENTS OF HOLOTYPE (Figs. 7-8). Tergite VIII with handlelike apodeme that apically curves slightly downward. Subsensillal sclerite with long bristle on blunt apex. Proximal arm of st. IX curved, broadest near pointed apex, with extremely small membranous mesal lobe below base of proximal arm. Distal arm with unsclerotized spiniform midway to apex, with three short spiniform bristles and one hairlike apical bristle. Clasper strongly resembles that of P. lewisi, with
fixed process having narrow mesal lobe with hairlike apical bristle situated just above mesal process. Fringe on fixed process with roughly 20 large, evenly-spaced bristles, with smaller bristles below ventralmost long bristles of fringe. Mesal process with elongate, sclerotized dorsal region, and distal end knobbed, curving dorsally. Whole mount appears to have ventral projection near proximal end, similar to that on mesal process of *P. lewisi*. Movable process triangular, with small apical bristles on posterior extension near large, submarginal, spiniform bristle at caudo-ventral angle, most similar to that of *P. lewisi*. Similarities involving movable process, st. IX and clasper place *P. angusticeps* with *P. lewisi* in Subgroup A-2 within Species Group A. Aedeagal apodeme broad, with proximal end blunt, and neck region broad. Aedeagal pouch with pronounced bulge near proximal end of ventral margin. Sclerotized inner tube broadest basally, curving at midpoint forming right angle.

**LENGTH.** Male 2.0 mm.

**Type Material**
**Argentina**
Puerto Madryn, Chubut Province, 42° 46' 8" 65° 03' W, ex. *Akodon (? olivaceus)*, 30-IV-78, leg. A. Kovacs, male holotype, (GM).
Plocopsylla athena Schramm and Lewis, 1987
(Figs. 10-13)


Diagnosis. Plocopsylla athena has five spines in the genal comb, the genal spine is separated by a gap that is, at most, only slightly wider than the basal width of the genal spine, and the prectenidial helmet width is much narrower than the length of the longest helmet spine. It is quite similar to P. chiris. Males of P. athena have a clasper that lacks a dorsal or mesal lobe. Males of P. chiris have a clasper with a small mesal lobe connected to a larger, more posterior mesal lobe that is overlapped by the dorso-apical bristles of the apical fringe. Females of P. athena have an anal stylet that is slightly tapered and roughly 2x as long as its basal width. Females of P. chiris are considered here to be a new species for reasons discussed in the section on host specificity.

Description. HEAD. Helmet quite narrow, with prectenidial width, at most, one-half length of longest helmet spine. Helmet striations widely spaced, usually fused posteriorly into groups of two to four, with adjacent groups appearing linked. Helmet comb of 11 basally-notched spines in holotype, 12 in allotype. Anterior margin of gena blunt, uneven, with knoblike protuberance near cephalo-ventral angle. Both sexes with three or four well-separated submarginal bristles along anterior margin of gena and three or four smaller lateral bristles between two long genital
bristles. Genal comb of five well-separated spines, with tapered
genal spine more than one-half length of adjacent spine in comb,
separated from adjacent spine by a gap no wider than basal width
of genal spine. Genal lobe narrow, truncate, lacking distal
expansion. Narrow preoral tuber, with height at midpoint almost
2x the basal length. First antennal segment with three
relatively long bristles in a row, curving from dorsal margin
onto mesal surface. Antennal bristles arise just ahead of
concave distal margin of second segment, with longest bristles
reaching midpoint of clava. THORAX. Pronotum with two rows of
bristles, with anterior row of intermediate-length bristles,
posterior row of long bristles plus intercalaries. Pronotal comb
consisting of 14 short spines, with blunt lobe below ventralmost
spine, similar in length to pronotal spines. Meso- and metanotum
each with two rows of bristles, similar to those of pronotum.
With two mesonotal pseudosetae per side. LEGS. Dorso-apical
bristles of hind tibia with the following bristle arrangement:
3-2-2-3-3-3-3. Lateral surface of hind tibia with one row of
bristles in allotype, branches distally into two rows in
holotype. ABDOMEN. Tergites each with two rows of bristles,
similar to those of pronotum. Holotype with anterior row lacking
in posterior tergites. Marginal spinelets of anterior tergites
of holotype: I 3/3, II 2/2, III 2/2, IV 2/2. Marginal spinelets
of anterior tergites of allotype: I 4/5, II 3/3, III 2/3, IV
2/3. Sternites II-VII of male and st. II-VI of female each with
two or three bristles in a row per side, better developed in
female. Sternite VII and t. VIII of female each with scattered bristles of varying lengths. Male with one flattened antepygidal bristle and one tiny accessory bristle per side, both on prominent pedestal. Female with one relatively short antepygidal bristle per side, slightly longer than fossa of spiracle on t. VIII.

MODIFIED ABDOMINAL SEGMENTS OF HOLOTYPE (Figs. 11-13).
Tergite VIII ovate, with thick apodeme having dorsal curve at proximal end. Subsensillial sclerite noticeably narrowed at apex, creating pedestal for curved bristle. Proximal arm of st. IX thick, basally curved, with apex blunt. Distal arm of t. IX straight, with small apical bristles, with two pairs of spiniform bristles, each pair consisting of two similar bristles. Region where proximal and distal arms join having tapered ventral margin. Clasper broad, with angle formed by t. IX and manubrium rounded. Fixed process with fringe consisting of 16 large, evenly-spaced bristles, with several smaller bristles at ends of fringe. Mesal process elongate, knobbed, with ends curving dorsally, no evidence in whole mount of membranous ventral lobe. Movable process elongate, with dorsal wing-like process opposite ventral spiniform bristle, with second spiniform bristle on curved apex, with typically two hair-like bristles on margin preceding ventral spiniform bristle. Certain features of movable process, st. IX and clasper place P. athena in Subgroup B-1 of Species Group B. Aedeagal apodeme elongate, with proximal end pointed, and neck region lacking pronounced curve and
constriction. Aedeagal pouch with undulating ventral margin. Sclerotized inner tube broadest at base and midpoint, curving about 45 degrees at midpoint.

MODIFIED ABDOMINAL SEGMENTS OF ALLOTYPE (Fig. 10).

Posterior margin of t. VIII with three or four bristles in notch between narrow lobe and caudo-ventral angle. Dorsal anal lobe with one tiny and several long bristles per side, lowest long bristle at apex of broad ventro-lateral extension. Spermatheca with hilla barely entering bulga. Hilla with anterior end slightly tapered, and similar to bulga in length. Anal stylet slightly tapered, roughly 2x as long as its basal width.

LENGTH. Both sexes 2.0 mm.

Type Material
Chile:

Plocopsylla chiris (Jordan, 1831a)
(Figs. 14-17)

Craneopsylla chiris. Jordan, 1831a, Novitates Zoologicae. 36-311-316, figs. 3-4.
There is good reason to doubt the identity of the lectoallotype and other two females on loan. This is discussed in the section on host specificity.

Diagnosis. *Plocopsylla chiris* has five spines in the genal comb, with the genal spine separated by a gap that is, at most, only slightly wider than the basal width of the genal spine. The prectenidial helmet width is much narrower than the length of the longest helmet spine and is quite similar to that of *P. athena*. Males of *P. chiris* have a clasper with a small mesal lobe connected to a larger, posterior mesal lobe that is overlapped by the dorsoapical bristles of the fringe of the fixed process. Males of *P. athena* have a clasper that lacks a dorsal or mesal lobe. Females of *P. chiris* are here considered to be a new species for reasons discussed in the section on host specificity. Differences when compared to the lectotype are noted in the description below. Females of *P. athena* have an anal stylet that is slightly tapered and roughly 2x as long as its basal width.

Description. HEAD. Prectenidial width of helmet variable; in lectotype this width is noticeably less than length of longest helmet spine, in females, this width is greater than that length. Helmet striations do not anastomose, with a noticeable gap between most striations and the bases of helmet spines. Lectotype with 11 helmet spines, females with 12. Bases of helmet spines variable, with prominent notches in lectotype, with notches slight or absent in females. Anterior margin of gena convex, with 7 to 14 well-separated submarginal bristles
extending between dorsal and ventral margins of gena. With five
to eight smaller lateral bristles between two long genal
bristles. Genal comb with five spines, with tapered genal spine
slightly shorter than adjacent spine in comb, separated from
adjacent spine by a gap narrower than basal width of genal spine.
Genal lobe truncate, with a slight distal expansion. Preoral
tuber narrow, with height at midpoint roughly 1.5 to 2x greater
than basal length. Antennal bristles arise along straight or
concave distal margin of second segment, with longest bristles
extending beyond apex of clava, broken off in lectotype. THORAX.
Pronotum with two rows of bristles; anterior row of long bristles
that may be preceded by several bristles, posterior row of
alternating long bristles and intercalaries. Pronotal comb with
approximately 22 spines, with small lobe below ventralmost spine
that is pointed in holotype, blunt in females. Meso- and
metanotum each with three rows of bristles, with anterior row of
several short bristles, middle row of intermediate-length
bristles, posterior row of alternating long bristles and
intercalaries. With two mesonotal pseudosetae per side. LEGS.
Dorso-apical notches of hind tibia with variable bristle
arrangement: 3-2-2-3-3-3-4 in lectotype, 3-2-3-4-4-4-4 in
females. Lateral surface of hind tibia essentially with a double
row of bristles. ABDOMEN. Tergites with anterior row of
intermediate-length bristles, somewhat reduced in lectotype, with
posterior row of alternating long bristles and intercalaries.
Marginal spinelets of anterior tegites of lectotype: I 4/3, II
3/3, III 3/3, IV 2/2, V 1/0. Marginal spinelets of anterior tergites of females: I 4/3-4, II 3-4/4, III 1/2, IV 0/0-1. Sternites II-VI of female each with several long bristles in a row per side, with st. VII and t. VIII of female each with scattered bristles of varying lengths. Male with one slender antepygidial bristle and one fairly stout accessory bristle per side, both on pedestal. Female with two elongate antepygidial bristles per side.

MODIFIED ABDOMINAL SEGMENTS OF MALE (Figs. 15-17). Tergite VII ovate, with apodeme straight. Subsensilial sclerite with long, thick bristle at tapered apex. Proximal arm of st. IX thick, with blunt apex. Distal arm small, with two pairs of spiniform bristles. Region broad where arms meet with blunt ventral margin. Clasper with broad fixed process having two connected mesal lobes. Anterior mesal lobe small, with apical bristle, and similar to mesal lobe in P. fuegina. Posterior lobe larger, overlapped by dorsoapical bristles of fringe, quite similar to mesal lobe of P. reigi. Fringe consisting of 20, evenly-spaced bristles, with several smaller bristles on lateral surface near fringe. Sclerotized dorsal region of mesal process elongate, with Knobbed ends curving dorsally, with membranous mid-ventral lobe appearing triangular in whole mount. Movable process elongate, with dorsal winglike process opposite bifid spiniform bristle, with second bifid spiniform bristle at apex. Typically, four hairlike bristles on margin preceding ventral spiniform bristle. The combination of characters involving
movable process, st. IX and clasper place P. chiris in Subgroup B-I of Species Group B. Aedeagal apodeme elongate, with proximal end pointed, with neck region lacking pronounced curve and constriction. Aedeagal pouch with ventral margin undulating. Sclerotized inner tube broad basally, curving at midpoint to form right angle.

MODIFIED ABDOMINAL SEGMENTS OF FEMALE (Fig. 14). Several long bristles located below prominent lobe on posterior margin of t. VIII. Dorsal anal lobe with one tiny and several long bristles per side, lowest long bristle just above blunt apex of reduced ventro-lateral extension. Spermatheca with hilla projecting deeply into elongate bulga. Hilla with anterior end tapered, longer than bulga. Anal stylet abruptly tapered, roughly 2x as long as its basal width.

LENGTH. Female 2.5-3.0 mm.

Type Material
Argentina
Pilcaniyeu (= Pilcaniyeu), Rio Negro Territory, 1000m, ex. Phyllotis xanthopygus, IV-20, leg. H. E. Box, male lectotype, (desig. Smit and Wright 1978), IF paralectotype, (BM).

Additional Material
Argentina
Ibid., except 23-VIII-59, IF, (BM).

Host Synonymy
Phyllotis xanthopygus = ?
Plocopsylla diana Beaucournu, Gallardo and Launay, 1886
(Figs. 18-21)


Diagnosis. Plocopsylla diana differs from all other Plocopsylla species by the presence of 18 to 20 basally-notched helmet spines.

Description. HEAD. Pretenidial width of helmet less than length of longest helmet spine. Helmet spines basally-notched. Both sexes with 18 to 20 helmet spines. Anterior margin of gena blunt, may be slightly concave near cephalo-ventral angle. Both sexes with 8 to 13 submarginal bristles extending between dorsal and ventral margins of gena. Both sexes with zero to five smaller bristles between two long genal bristles. Genal comb with five spines, with tapered genal spine slightly shorter than adjacent spine in comb, separated by a gap much wider than basal width of genal spine. Genal lobe narrow, rounded distally. Preoral tuber usually resembles inverted tear drop. Antennal bristles arise ahead of concave distal margin of second segment, with longest bristles extending to midpoint of clava. THORAX. Pronotum with two rows of bristles, with anterior row consisting of intermediate-length bristles, posterior row of alternating long bristles and intercalaries. Pronotal comb usually with 16 relatively short spines, with broad lobe below ventralmost spine, similar in length to that spine. Meso- and metanotum each with two rows of bristles, similar to those of pronotum. Usually two
mesonotal pseudosetae per side. LEGS. Dorso-apical notches of
hind tibia with bristles generally arranged as follows:
3-2-2-3-3-3-2. Lateral surface of hind tibia with variable
arrangement of bristles. ABDOMEN. Tergites each with two rows of
bristles, similar to those of pronotum. Marginal spinelets of
anterior tergites of female: I 4-5/1-4, II 2-4/3-5, III 2-3/3-4,
IV 1-3/2-3, V 0-2/1-2. Sternites II-VI each with several long
bristles in a row per side, with st. VII and t. VIII of female
having scattered bristles of varying lengths. Male with one
flattened antepygidal bristle and one small, stout accessory
bristle per side, both on pedestal. Female with one flattened
antepygidal bristle per side.

MODIFIED ABDOMINAL SEGMENTS OF HOLOTYPE (Figs. 19-21).
Subsensillar sclerite with long, hairlike, subapical bristle.
Sternite IX with proximal arm thick, with apex blunt. Distal arm
with curve preceding apex, with two spiniform bristles paired
midway to apex, with two additional distal, well-separated
spiniform bristles. Fringe on fixed process of 14 large
bristles, with gaps usually associated with fifth and sixth
bristles, with smaller marginal and lateral bristles near fringe.
Fixed process with mesal lobe broad, projecting above
dorso-apical margin of fixed process. Mesal process with dorsal
region rectangular, well sclerotized, appears in whole mount to
have large, membranous, midventral lobe. Movable process
elongate, with dorsal winglike process opposite ventral spiniform
bristle, second spiniform bristle subapical, similar to movable
processes of other Species Group B taxa except for prominent bulge midway along ventral margin. Specific characters regarding movable process, st. IX and clasper place P. diana by itself in Subgroup B-2 within Species Group B.

MODIFIED ABDOMINAL SEGMENTS OF FEMALE (Fig. 18). Dorsal anal lobe with one tiny and several long bristles, lowest long bristle at apex of elongate ventro-lateral extension. Spermatheca with no penetration of hilla into elongate bulga. Hilla broadest at midpoint, with hilla roughly half length of bulga. Anal stylet usually abruptly tapered, 2x as long as basal width.

LENGTH. Both sexes 2.0 mm.

Type Material
Chile:

Additional Material
Chile:

Plocopsylla enderleini Wagner, 1933  (Figs. 22-25)


Diagnosis. Plocopsylla enderleini is similar to P. pallas and P. viracocha in having a genal comb of six spines and helmet spines that are not basally notched. It differs from both species by having a prectenidial helmet width that is less than 1.5x the length of the longest helmet spine. Males can be separated from males of P. viracocha by the presence of a prominent dorsal lobe preceding the apical fringe on the clasper. Males of P. pallas are unknown. Females differ by having five or six long bristles in a row below the lobe on the posterior margin of t. VIII rather than three or four long, well-separated bristles below that lobe as in females of P. viracocha and P. pallas, respectively.

Description. HEAD. Prectenidial width of helmet usually similar in length to longest helmet spine, always less than 1.5x length of longest helmet spine. Helmet striations not fused, with posterior ends reaching bases of helmet spines. Helmet spines without basal notches, with males usually having 14 spines, females with 15. Anterior margin of gena convex. Both sexes with 8 to 16 submarginal bristles extending from dorsal to ventral margins of gena, with middle bristles set well back from margin. Both sexes usually with two to five smaller lateral
bristles between two long genal bristles. Genal comb consists of six spines, with genal spine no more than one-half length of adjacent spine in comb, separated from adjacent spine by a gap wider than basal width of genal spine. Genal lobe truncate, with slight distal expansion. Preoral tuber campanulate. Antennal bristles arise along straight or convex distal margin of second segment, with longest bristles extending beyond apex of clava.

THORAX. Pronotum with three rows of bristles, first two rows of intermediate-length, third row of alternating long bristles and intercalaries. Pronotal comb usually with 24 to 26 spines, with small lobe below ventralmost spine, less than one-half length of that spine. Meso- and metanotum each with two or three rows of bristles, similar to those of pronotum. Numerous small, scattered bristles may precede rows on mesonotum. Usually two mesonotal pseudosetae per side. LEGS. Dorso-apical notches of hind tibia usually with the following bristle arrangement: \(<2\) or \(3)\)-2-3-3-3-3-4. Bristles scattered across lateral surface of hind tibia. ABDOMEN. Tergites I-VI each with two rows of bristles, similar to those of pronotum. Anterior row usually reduced on posterior tergites, with anterior row often missing on t. VII of male, with anterior row of t. VII of female often grouped rather than in a row. Marginal spinelets of anterior tergites of male: I 3-4/2-5, II 2-4/1-4, III 1-4/1-3, IV 0-3/0-1. Marginal spinelets of anterior tergites of female: I 3-6/2-5, II 2-9/2-6, III 1-4/1-4, IV 0-3/0-3. Sternites II-VII with several long bristles in a row per side, better developed in
female, with st. VII and t. VIII of female each having scattered bristles of varying lengths. Male without antepygidial and accessory bristles. Female with two elongate antepygidial bristles per side.

**MODIFIED ABDOMINAL SEGMENTS OF MALE (Figs. 23-25).**

Subsensillar sclerite with bristle positioned on concave posterior margin. Sternite IX strongly resembles that of *P. viracocha* with proximal arm strongly curved at midpoint, almost forming right angle. Distal arm with two well-separated spiniform bristles at or preceding curved apex, with lower spiniform bristle more than 2x length of upper spiniform bristle. Fringe on fixed process usually with 12 large evenly-spaced bristles, with smaller bristles on prominent mesal lobe preceding fringe as well as laterally and marginally near fringe. Mesal process broad, with expanded distal end preceded by constriction, similar to those of *P. hector* and *P. viracocha*. Movable process broadly triangular, with submarginal spiniform bristle at caudo-ventral angle, differs from that of *P. viracocha* by having dorsal apex abruptly tapered, not rounded. Specific characters of movable process, st. IX and clasper place *P. enderleini* with *P. viracocha* in Subgroup A-3 of Species Group A. Aedeagal apodeme elongate, with blunt proximal end, with neck region lacking pronounced curve and constriction. Aedeagal pouch with ventral margin fairly smooth. Sclerotized inner tube narrow, curving beyond midpoint to form right angle.

**MODIFIED ABDOMINAL SEGMENTS OF FEMALE (Fig. 22).** Dorsal
anal lobe with row of long bristles along ventral margin, lowest long bristle at apex of elongate ventro-lateral extension.

Spermatheca with hilla penetrating deeply into reniform bulga.

Hilla uniform in width, similar in length to bulga. Anal stylet elongate, roughly 4x as long as its basal width.

LENGTH. Male 3.5 mm; female 4.0-4.25 mm.

Type Material
Bolivia:
Vicinity of La Paz, ex. "rat" (? order hamster, Wagner 1939),
leg. A. Stoekker, male lectotype (desig. unknown), BM 10F paralectotypes (lectotype, 2MB, 1M 2F paralectotypes, JWC, 1M 1F paralectotypes, BM).

Additional Material:
Chile:

Peru:


Ibid., except ex. Chinchillula, Akodon or Phyllotis, 15-IX-41, 1M 1F, (RL).

Ibid., except ex. Chinchillula sahamae, Akodon pulcherrimus cruci or Phyllotis pictus, 15-IX-51, 1M 1F, (BM).

Ibid., except ex. Chinchillula sahamae, Akodon pulcherrimus cruci or Phyllotis pictus, 15-IX-51, 1M 1F, (BM).

Vicinity of La Paz, ex. "rat" (? order hamster, Wagner 1939), leg. A. Stoekker, male lectotype (desig. unknown), BM 10F paralectotypes (lectotype, 2MB, 1M 2F paralectotypes, JWC, 1M 1F paralectotypes, BM).

Additional Material:
Chile:

Peru:


Ibid., except ex. Chinchillula, Akodon or Phyllotis, 15-IX-41, 1M 1F, (RL).

Ibid., except ex. Chinchillula sahamae, Akodon pulcherrimus cruci or Phyllotis pictus, 15-IX-51, 1M 1F, (BM).


Tacna. 21 m NE Tarata, 15400ft, ex. Chinchillula sahamae, 29-IV-51, leg. C. B. Koford, 2F, (USNM).

Host Synonymy

Phyllotis pictus = Auliscomys pictus
Diagnosis. *Plocopsylla fugina* resembles *P. traubi* in having basally-notched helmet spines and five spines in the genal comb, with the genal spine separated from the adjacent spine by a gap more than 1.5x wider than the basal width of the genal spine. Males have one flattened antepygidal bristle and one small, stout accessory bristle per side, both on a prominent pedestal. 

Males of *P. traubi* are unknown. Females either lack a notch below the lobe on the posterior margin of t. VIII with several long bristles at the caudo-ventral angle, or, the lower margin of the lobe curves downward before meeting the ventral margin of t. VIII with several long bristles crowded along the curved region. In contrast, females of *P. traubi* have a rectangular notch below the lobe on the posterior margin of t. VIII with several bristles arising from the middle of this notch.

Description. HEAD. Pretenidial width of helmet roughly three-fourths length of longest basally-notched helmet spine. Helmet striation pattern variable, with some striations fused posteriorly into groups of about four, other striations remain distinct. Males with 10 or 11 helmet spines, 12 or 13 in females. Anterior margin of gena convex, may appear slightly truncate. Male with two to five submarginal bristles along anterior margin of gena that can extend linearly from dorsal to...
ventral margins, female with four to nine bristles. Male with three smaller lateral bristles between two long genal bristles, female with three to six bristles. Genal comb of five spines, with slender genal spine somewhat shorter than adjacent spine in comb, separated by a gap, at least, 1.5x basal width of genal spine. Genal lobe rounded, distally expanded. Preoral tuber narrow, height at midpoint roughly 2x its basal length. Antennal bristles arise along concave distal margin of second segment, with longest bristles extending beyond apex of clava. THORAX. Pronotum with two rows of bristles; anterior row of intermediate-length, posterior row of alternating long bristles and intercalaries. Pronotal comb of 14 to 20 spines, with somewhat pointed lobe below ventralmost spine, slightly shorter than that spine. Meso- and metanotum with two rows of bristles, similar to those of pronotum. Usually two mesonotal pseudosetae per side. LEGS. Dorso-apical notches of hind tibia usually with the following bristle arrangement: 3-2-2-3-3-3-3. Lateral surface of hind tibia usually with one row of bristles that diverges distally. ABDOMEN. Tergites I-VI with two rows of bristles, similar to those of pronotum. Anterior row often reduced on posterior tergites, with t. VII of female having anterior row often grouped rather than in a row. Marginal spinelets on anterior tergites of male: I 3-4/3-4, II 2-3/2-3, III 2/1-2, IV 1-2/1. Marginal spinelets of anterior tergites of female: I 3-8/2-5, II 2-3/1-3, III 1-3/2-3, IV 1-3/1-3. Sternites II-VII of male and st. II-VI of female each with
several long bristles in a row per side, better developed in female. Sternite VII and VIII of female each having scattered bristles of varying lengths. Male with one long, flattened antepygidal bristle and one small accessory bristle per side, both on prominent pedestal. Female with one long antepygidal bristle per side.

MODIFIED ABDOMINAL SEGMENTS OF MALE (Figs. 27-29).

Subsensillar sclerite with elongate apex forming pedestal for bristle. Sternite IX with proximal arm relatively thick, with distal arm with two pairs of spiniform bristles, each pair consisting of similar bristles. Region broad where proximal and distal sternite arms join, with blunt ventral margin. Fringe on clasper with 16 to 18 large, evenly-spaced bristles, preceded by small mesal lobe with apical bristle, with smaller bristles near fringe. Mesal process with dorsal region elongate, curved, visible in whole mount due to sclerotization, with prominent membranous ventral lobe visible only in dissected material. Movable process elongate, with dorsal winglike process opposite ventral spiniform bristle, with second bifid spiniform bristle at apex, typically with two hairlike bristles preceding ventral spiniform bristle. Due to certain features of movable process, st. IX and clasper, P. fuegina is assigned to Subgroup 8-1 in Species Group B. Aedeagal apodeme elongate, with pointed proximal end, with neck region lacking pronounced curve and constriction. Ventral margin of aedeagal pouch with prominent cephalo-ventral bulge. Sclerotized inner tube noticeably
tapered, curving almost into right angle.

MODIFIED ABDOMINAL SEGMENTS OF FEMALE (Fig. 20). Dorsal anal lobe usually with one tiny and several long bristles per side, lowest long bristle set well above apex of elongate ventro-lateral extension. Spermatheca with hilla not penetrating into reniform bulga. Hilla of uniform width, shorter than bulga. Anal stylet broad, 2x as long as basal width.

LENGTH. Male 2.0 mm; female 3.0 mm.

Type Material
Chile:
La Merced, Province de Tierra del Fuego, 53° 20' S 70° 25' W, (<2 paratypes recorded as 53° 15' S 70° 15' W), 30m, ex. Ctenomys magellanicus fuegicus, 10-II-76, leg. M. Gallardo, male holotype, female allotype, 5M 14F paratypes.
La Cumbre, Cordillera Baguales, Province d'Ultima Esperanza, 50° 40' S 72° 25' W, 800m, ex. Ctenomys magellanicus magellanicus, 17-I-77, leg. M. Gallardo, IM 7F paratypes.
Useless Bay (Bahia Inutil), Province Tierra del Fuego, 53° 30' S 69° 30' W, ex. Ctenomys magellanicus (fuegicus), 10-II-05, leg. R. Crawshay, IF paratype, (BM).

Holotype, allotype, paratypes, (JCB), paratypes, (BM, U. A. de Chile).

Additional Material
Chile:

Plocopsylla hector Jordan, 1931b
(Figs. 30-33)


Diagnosis. Plocopsylla hector closely resembles P. kilva in having the bristles along the dorsal margin of the hind tibia forming a complete false comb. It differs from P. kilva by having a prectenidial helmet width that is roughly equal to or greater than the length of the longest helmet spine, rather than roughly three-fourths that length. Males have a broad mesal process that is similar in length to the antepygidial bristle, unlike males of P. kilva which have an elongate mesal process 2x as long as the antepygidial bristle. Females can be distinguished by the presence of a cylindrical anal stylet that is roughly 4x as long as its basal width compared to females of P. kilva which have a tapered anal stylet which is roughly 3x as long as its basal width.

Description. HEAD. Prectenidial width of helmet roughly equal to or greater than length of longest helmet spine. Helmet striations do not anastomose, occasionally end at varying distances from helmet spines. Both sexes generally with 14 or 15 basally-notched helmet spines. Anterior margin of gena blunt. Both sexes usually lacking submarginal bristles along anterior margin of gena. Male usually with one or two smaller lateral
bristles, female with two to four smaller lateral bristles between two long genal bristles. Genal comb of four spines. Broad genal lobe truncate, with expanded distal margin. Preoral tuber narrow, height at midpoint 2x its basal length. Antennal bristles arise just ahead of concave distal margin of second antennal segment, with longest bristles never reaching midpoint of clava. THORAX. Pronotum with two rows of bristles; first row of intermediate-length, second row of alternating long bristles and intercalaries. Pronotal comb usually of 18 to 22 spines, with narrow lobe below ventralmost spine, roughly one-half length of that spine. Meso- and metanotum with two rows of bristles, similar to those of pronotum; mesonotum with scattered smaller bristles preceding rows. Usually two mesonotal pseudosetae per side. LEGS. Hind tibia with complete false comb. Lateral surface of hind tibia essentially with one column of bristles. ABDOMEN. Tergites I-VI with two rows of bristles, similar to those of pronotum; mesonotum with scattered smaller bristles preceding rows. Usually two mesonotal pseudosetae per side. Legs. Hind tibia with complete false comb. Lateral surface of hind tibia essentially with one column of bristles. ABDOMEN. Tergites I-VI with two rows of bristles, similar to those of pronotum. Anterior row reduced in posterior tergites, may be missing on t. VI and/or t. VII of male. Marginal spinelets of anterior tergites of male: I 2-0/0-6, II 2-5/2-4, III 1-4/1-3, IV 0-2/0-1. Marginal spinelets of anterior tergites of female: I 3-7/2-6, II 2-6/2-6, III 0-3/1-3, IV 0-2/0-2. Sternites II-VII of male and st. II-VI of female each with several bristles in a row per side, better developed in female. Sternites VII and t. VIII of female having scattered bristles of varying lengths. Male with one antepygidial bristle and one slender accessory bristle per side, with antepygidial bristle
similar in length to mesal process. Female with two antepygidal bristles per side, at least 2x length of anal stylet.

MODIFIED ABDOMINAL SEGMENTS OF MALE (Figs. 31-33).
Subsensilial sclerite with large bristle along convex posterior margin. Sternite IX with membranous mesal lobe below base of proximal arm. Distal arm with two spiniform bristles at midpoint, lower roughly 2x length of upper, with several hairlike bristles at foot-shaped apex. Distal arm of holotype with elongate spiniform bristle between two short spiniform bristles. Clasper fringe of 9 or 10 large bristles, with fourth one isolated by gaps, with smaller bristles scattered near fringe. Mesal process broad, with expanded distal end preceded by slight constriction, similar to those of P. enderleini and P. viracocha. Movable process somewhat triangular, with group of long bristles on mesal surface that reach base of submarginal spiniform bristle projecting beyond caudo-ventral angle. Characters of movable process, st. IX and clasper place P. hector in Subgroup A-1 of Species Group A. Aedeagal apodeme narrow, elongate, with blunt proximal end, with neck region lacking pronounced curve and constriction. Aedeagal pouch with smooth ventral margin. Sclerotized inner tube with dorsal bulge, apically tapered, curving about 45 degrees at midpoint.

MODIFIED ABDOMINAL SEGMENTS OF FEMALE (Fig. 30). Dorsal anal lobe with one tiny and several long bristles per side, lowest long bristle at, or very near, apex of broad ventro-lateral extension. Spermatheca with hilla barely entering
elongate bulga. Hilla slightly narrowed before entering bulga, shorter than bulga. Anal stylet cylindrical, 4x as long as its basal width.

LENGTH. Male 2.25-2.75 mm.; female 2.5-3.0 mm.

Type Material
Ecuador:

Additional Material
Ecuador:

Peru:
Ibid., except 23-IV-56, 1M 1F, (BM).
Huancabamba, Tambo, Dept. of Piura, 2800m, ex. *Thomasonus* sp., 8-V-54, leg. C. Kalinowski, 1F, (RT).

Host Synonymy

*Blarina equatoris* = *Cryptotis equatoris* = ?
Plocopsyilla heros Jordan, 1933
(Figs. 34-37)


Diagnosis. Plocopsyilla heros, by having four spines of normal length in the genal comb but without a complete or incomplete false comb on the posterior margin of the hind tibia, is similar to P. phobos, P. nungui and P. thor. Males differ from the males of all three species by having a prominent posterior extension on t. VIII. Females usually have four to six submarginal bristles along the anterior margin of the gena and two smaller lateral bristles between the two long genal bristles, while females of P. thor usually have zero to three submarginal bristles along the genal margin and two to four smaller lateral bristles between the two long genal bristles. Females differ from females of P. phobos by having an anal stylet usually 2.5 to 3x as long as its basal width rather than 3 to 4x as long. Females contrast with females of P. nungui by having two, not three, antepygidal bristles.

Description. HEAD. Prepectenidial width only slightly greater than length of longest basally-notched helmet spine. Helmet
striations usually fused posteriorly into groups of five or six. Both sexes with 13 or 14 helmet spines. Anterior margin of gena with upper one-half convex, with concave lower one-half usually creating pronounced angular or knoblike cephalo-ventral angle. Male with three to five well-separated submarginal bristles on upper one-half of anterior margin, female with five or six. Male with two, female with two to four, smaller lateral bristles between two long genal bristles. Genal comb consists of four spines. Genal lobe rounded, expanded distally. Preoral tuber campanulate, with height at midpoint roughly 1.5x its basal length. Antennal bristles arise along or just ahead of concave distal margin of second segment, with longest bristles extend to midpoint of clava. THORAX. Pronotum with two rows of bristles, with anterior row of intermediate-length bristles, posterior row of alternating long bristles and intercalaries. Pronotal comb of 14 to 16 spines, with narrow lobe below the ventralmost spine slightly shorter than that spine. Meso- and metanotum each with two rows of bristles, similar to those of pronotum. Usually one or two mesonotal pseudosetae per side. LEGS. Dorsal notches of hind tibia usually with the following bristle arrangement: 3-2-2-3-3-3-3. Bristles on lateral surface of hind tibia arranged more or less in two rows. ABDOMEN. Tergites I-VII each with two rows of bristles, similar to those of pronotum, anterior row reduced on posterior tergites. Marginal spinelets of anterior tergites of male: I 3-4/3, II 3/2-3, III 2-4/3, IV 2/2-3. Marginal spinelets of anterior tergites of female: I
3-5/4-5, II 3-5/3-4, III 3/2-4, IV 1-3/2. Sternites II-VI each with several bristles in a row per side, better developed in female. Female with scattered bristles of varying lengths on st. VII and t. VIII. Male with one stout antepygial bristle per side, shorter than hairlike accessory bristle. Female with two antepygial bristles per side.

**MODIFIED ABDOMINAL SEGMENTS OF MALE (Figs. 35-37).** Tergite VIII modified with prominent posterior extension. Subsensillial sclerite with long, curved subapical bristle. Proximal arm of st. IX with broad apex, and a membranous mesal lobe below base of arm. Distal arm with two spiniform bristles, lower elongate and tapered, roughly one-third length of distal arm. Clasper fringe of 12 to 13 large bristles with fourth, fifth and sixth bristles separated by gaps, and with smaller lateral bristles scattered near fringe. Mesal process with dorsal margin elongate, curved, visible in whole mount due to sclerotization, with membranous ventral lobe at proximal end having a pointed cephalo-ventral angle. Movable process triangular, with angular spiniform bristle near caudo-ventral angle. Characters involving movable process, st. IX and clasper place *P. heros* in Subgroup A-1 of Species Group A. Aedeagal apodeme elongate, with blunt proximal end, with neck region having prominent curve and constriction. Aedeagal pouch with ventral margin relatively smooth. Sclerotized inner tube narrows abruptly, curving roughly 45 degrees midway to apex.

**MODIFIED ABDOMINAL SEGMENTS OF FEMALE (Fig. 34).** Dorsal
anal lobe with one tiny and several long bristles per side, lowest long bristle set well above apex of broad ventro-lateral extension. Spermatheca with no penetration of hilla into reniform bulga. Hilla relatively wide, narrowing slightly before entering bulga, with hilla somewhat shorter than bulga. Anal stylet elongate, 3x as long as its basal width.

LENGTH. Male 2.0 mm; female 2.5-3.0 mm.

Type Material
Ecuador

Type series of lectotype, 9 paralectotypes collected from all 4 sites. Those in BM listed.

Additional Material
Ecuador

Host Synonymy
Blarina equatoris = Cryptotis equatoris = ?
Blarina thomasi = Cryptotis thomasi
**Plocopsylla inti** Johnson, 1957

*(Figs. 38-41)*


Diagnosis. *Plocopsylla inti* differs from all other species by having seven spines in the genal comb.

Description based on Johnson (1957). **HEAD.** Presectenidial width of helmet 2x greater than length of longest helmet spine. Holotype male with 15 helmet spines, not notched basally. Anterior margin of gena convex. Holotype with two smaller lateral bristles between two long genal bristles. Genal comb consisting of seven spines, with genal spine slightly shorter than adjacent spine in comb, separated by a gap narrower than basal width of genal spine. Genal lobe quite narrow, slightly wider than genal spine. Antennal bristles arise along pronounced convex distal margin of second segment, longest bristles extending beyond apex of clava. **THORAX.** Pronotum with two rows of bristles. Pronotal comb of 23 to 25 spines. Meso- and metanotum with four and three irregular rows of bristles, respectively. **LEGS.** Dorsal notches of hind tibia usually with the following bristle arrangement: 3-2-3-3-3-3-4. Lateral surface of hind tibia of holotype with one row of bristles that branches distally into two or three rows. **ABDOMEN.** Tergites with anterior row of bristles reduced; t. II and III of holotype with additional row. Male without antepygidal or accessory bristles.
Female with one antepygidal bristle per side.

MODIFIED ABDOMINAL SEGMENTS OF MALE (Figs. 39-41).
Subsensillar sclerite with straight apical bristle. Proximal arm of st. IX with pronounced curve midway to apex. Distal arm with two close-set apical spiniform bristles, with large, posteriorly-directed apical lobe armed with several hairlike bristles. Fixed process with prominent dorsal lobe preceding, but well separated from, apical fringe of long bristles. Fringe usually of 12 large bristles, and with gaps between fourth and fifth bristles, with smaller lateral and marginal bristles scattered near fringe. Mesal process appears to be broadly U-shaped in whole mount, much wider at proximal end. Movable process triangular, with deep notch separating dorsal apex from pronounced angular projection midway along posterior margin, with small submarginal spiniform bristle near caudo-ventral angle. Based on a combination of characters involving movable process, st. IX and clasper, *P. inti* is the sole member of Subgroup A-4 in Species Group A. Aedeagal apodeme elongate, with proximal end blunt, with broad neck region lacking pronounced curve and constriction. Sclerotized inner tube narrow, apically tapered, curving to form right angle.

MODIFIED ABDOMINAL SEGMENTS OF FEMALE (Fig. 38).
Spermatheca with hilla penetrating deeply into bulga. Hilla noticeably shorter than bulga. Anal stylet roughly 2.5x longer than its basal width.
Type Material
Peru:
Ibid., except ex. Phyllotis (Phyllotis) darwinii ssp., female allotype, (USNM), 1F paratype, (RT).

Plocopsylla Kilya Schramm and Lewis, 1987
(Figs. 42-45)

Plocopsylla Kilya. Schramm and Lewis, 1987,

Diagnosis. This species may be separated from all other species, except P. hector in having the bristles along the dorsal margin of the hind tibia forming a complete false comb. It differs from P. hector by having a prectenidial helmet width that is roughly three-fourths the length of the longest helmet spine rather than similar to or longer than this length. Males differ by having an elongate mesal process that is at least 2x the length of the antepygidial bristle. In contrast, males of P. hector have a broad mesal process and an antepygidial bristle that are similar in length. Females have a tapered anal stylet that is roughly 3x as long as its basal width, in contrast to females of P. hector which have a cylindrical anal stylet that is roughly 4x as long as its basal width.

Description. HEAD. Prectenidial width of helmet narrow, roughly three-fourths length of longest helmet spine. Helmet striation pattern variable, may anastomose posteriorly into groups of three to five. Usually 14 or 15 basally-notched helmet
spines. Anterior margin of gena usually with upper one-half convex, lower one-half concave. Male usually with two to four well-separated submarginal bristles along anterior margin of gena, female usually with one to five bristles. Both sexes usually with two to four smaller, lateral bristles between two long genal bristles. Genal comb of four spines. Genal lobe quite broad and truncate, expanded distally. Preoral tuber with height at midpoint only slightly greater than basal length. First antennal segment with one long dorsal and one long mesal bristle. Antennal bristles arise slightly ahead of concave distal margin of second segment, with longest bristles not reaching midpoint of clava. THORAX. Pronotum with two rows of bristles. The anterior row of intermediate-length bristles which may be preceded by several intermediate-length bristles, posterior row of alternating long bristles and intercalaries. Pronotal comb of 16 to 18 spines, with broad lobe below ventralmost spine, at least three-fourths length of that spine. Meso- and metanotum each with two rows of bristles, similar to those of pronotum. Usually with two mesonotal pseudosetae per side. LEGS. Dorso-apical bristles of hind tibia forming complete false comb, similar to that of P. hector. Lateral surface of hind tibia with one row of bristles. ABDOMEN. Tergites each with two rows of bristles, similar to those of pronotum. Anterior row reduced or missing on posterior tergites, with t. VII of female having bristles of anterior row often grouped rather than in a row. Marginal spinelets of anterior tergites of male: 1
Marginal spinelets of anterior tergites of female: I 2-5/3-5, II 3-5/3-4, III 2-4/2-4, IV 0-3/2-4. Sternites II-VI each with several bristles in a row per side. Sternites VII and VIII of female having scattered bristles of varying lengths. Male with one relatively short antepygidial bristle and much shorter hairlike accessory bristle per side. Female with two antepygidial bristles per side, each less than 2x length of anal stylet.

**MODIFIED ABDOMINAL SEGMENTS OF MALE (Figs. 43-45).** Tergite VIII ovate, with thick apodeme having proximal end curving dorsally. Subsensillial sclerite with narrowed apex forming pedestal for curved, apical bristle. Proximal arm of st. IX with posterior margin undulating, with noticeable protuberance near junction with distal arm, and with membranous mesal lobe below base of arm. Distal arm of st. IX with two well-separated spiniform bristles, lower long and rectangular, upper small and blunt, with two long and several minute apical bristles. Fixed process narrow, with apical fringe usually of 12 large bristles, with gaps typically separating fifth bristle, with smaller lateral bristles near fringe. Mesal process narrow, slightly curved, with proximal end slightly expanded, elongate, at least 2x as long as antepygidial bristle. No membranous ventral lobe observed in dissected material. Movable process triangular, with angular spiniform bristle set above pronounced, ventrally-projecting caudo-ventral angle, and with posterior margin extremely convex. Certain features of movable process,
st. IX and clasper place P. kilva in Subgroup A-1 of Species
Group A. Aedeagal apodeme elongate, with blunt proximal end,
with neck region having pronounced curve and constriction.
Aedeagal pouch with smooth ventral margin. Sclerotized inner
tube broad basally, apex curving about 45 degrees.

MODIFIED ABDOMINAL SEGMENTS OF FEMALE (Fig. 42). Dorsal
anal lobe with one tiny and several long bristles per side,
lowest long bristle set well above apex of broad ventro-lateral
extension, one female with long apical bristle. Spermatheca with
hilla penetrating deeply into bulga. Hilla widest at anterior
end, similar in length to bulga. Anal stylet tapered, 3x as long
as its basal width.

LENGTH. Male 2.0 mm; female 2.0-2.25 mm.

Type Material
Peru:
Huancabamba, Tambo, Dept. of Piura, 2000m, ex. Thosamosmys
sp., 8-V-54, leg. C. Kalinowski, male holotype, female
allotype, 2M 1F paratypes, (RT).

Additional Material
Peru:
Piura. Canchaque, Tambo, ex. Thomasomyys sp., 14-II-55,
El Tambo. 5 21 35 S 79 33 W. 3100m, ex. Thomasomyys cinereus,
Ibid., except 24-IV-56, 3M 6F, (BM).
Ibid., except ex. Thomasomyys taczanowski, 24-IV-56, 5M 5F,
(BM).
Ibid., except ex. Akodon mollis, 3F, (BM).
Huancabamba, 1960m, ex. Oryzomys xantheolus, 19-IV-56, leg.
J. M. de la Barrera, 2M 2F, (BM).
Plocopsylla lewisi. Beaucournu and Gallardo, 1987,

Diagnosis. Plocopsylla lewisi resembles P. reigi and P. wolffsohnii with five spines in the genal comb, with the genal spine separated from the adjacent spine in the comb by a gap, at most, slightly wider than the basal width of the genal spine and by having a prectenial helmet width that is similar to the length of the longest helmet spine. Plocopsylla lewisi differs from both P. reigi and P. wolffsohnii by having helmet spines that lack basal notches. Males of P. lewisi differ from males of the other two species by having a triangular movable process with one spiniform bristle rather than an elongate movable process with two spiniform bristles. Females of P. lewisi differ by having one long bristle set well above the apex of the ventro-lateral extension of the dorsal anal lobe rather than one long apical bristle as in females of P. reigi and P. wolffsohnii.

Description. HEAD. Precenial width of helmet similar to length of longest helmet spine. Helmet spines not notched basally. Helmet widest at fifth dorsal spine in males, sixth dorsal spine in females. Helmet striations not fused, often with fragments of striations between elongate striations and bases of helmet spines. Helmet comb generally of 11 or 12 spines, with gap separating both ends of helmet ctenidium from dorsal and ventral helmet margins. Anterior margin of gena convex. Both
sexes with 7 to 14 usually closely-spaced submarginal bristles that extend linearly from dorsal to ventral margins of gena. Both sexes usually with five to seven smaller, lateral bristles between two long genal bristles. Genal comb of five spines, with genal spine slightly shorter than adjacent spine in comb, usually separated from adjacent spine by a gap no wider than basal width of genal spine. Genal lobe rounded, with slight distal expansion. Preoral tuber rounded dorsally with small angular projection usually at midpoint of posterior margin. Occiput with numerous small bristles preceding four rows of prominent bristles, with posterior row consisting of long bristles plus intercalaries, similar to main setal rows on thoracic and abdominal tergites. First antennal segment usually with one to three small mesal bristles near base, three longer bristles in row curving from dorsal margin onto mesal surface. Antennal bristles arise along straight or slightly convex distal margin of second segment, with longest bristles extending beyond apex of clava. THORAX. Pronotum with essentially two rows of bristles, although a few scattered bristles may precede the rows. The anterior row is of intermediate-length bristles, the posterior of alternating long bristles and intercalaries. Pronotal comb of 20 to 24 long spines, with narrow lobe below ventralmost spine, much shorter than pronotal spines. Meso- and metanotum generally with three rows of bristles, with anterior two rows of intermediate-length bristles, posterior row of alternating long bristles and intercalaries. Usually with two mesonotal
pseudosetae per side. LEGS. Elongate dorso-apical bristles of hind tibia usually with the following arrangement: 3-2-2 or 3)-4-4-4-4. Lateral surface of hind tibia with a single row of bristles that branches distally. ABDOMEN. Tergites each with two rows of bristles with anterior row consisting of intermediate-length bristles, posterior row of alternating long bristles plus intercalaries. Anterior row reduced on posterior tergites, may be missing on t. VII of male. Marginal spinelets of anterior tergites of males: I 3-5-3-5, II 3-4/3-4, III 2-4/3-5. IV 0-2/1-2. Marginal spinelets of anterior tergites of female: I 3-6/2-5, II 3-6/3-6, III 1-4/1-4, IV 0-1/0-1. Sternites each with several bristles in a row per side, better developed in female. Female with st. VII and t. VIII having scattered bristles of varying lengths. Male with one antepygidial bristle per side, roughly 3x length of accessory bristle. Female with two subequal antepygidial bristles per side.

MODIFIED ABDOMINAL SEGMENTS OF MALE (Figs. 47-49). Tergite VIII with narrow apodeme, more or less straight. Apex of subsensillial sclerite somewhat footshaped, with stout apical bristle slightly longer than hairlike accessory bristle. Proximal arm of st. IX thick, slightly curved, apically pointed. Distal arm straight, with three spiniform bristles midway to apex, the uppermost one unsclerotized, with smaller additional spiniform bristles near apex. Clasper similar to that of P. angusticeps, with significantly wide angle formed by manubrium
and apodema of t. IX, with narrow, mesal lobe with hairlike apical bristle above mesal process. Clasper fringe containing 17 to 20 large bristles, ventrally almost two slightly smaller. Usually with slender bristle on clasper margin below apical fringe. Mesal process unique, with proximal and distal ends expanded, proximal and distal margins concave. Movable process triangular, with prominent dorsal apex, a vertical posterior margin, and with a large, submarginal spiniform bristle at caudo-ventral angle overlapped by two membranous, cylindrical projections, each bearing apical bristles. Structural similarities with P. angusticeps involving movable process, st. IX and clasper place P. lewisi in Subgroup A-2 of Species Group A. Aedeagal apodeme broad, with proximal end blunt, with neck region lacking pronounced curve and constriction. Aedeagal pouch with ventral margin undulating. Sclerotized inner tube broadest basally, curving at midpoint forming right angle.

modified abdominal segments of female (fig. 46). Several long bristles associated with more ventral of two lobes on posterior margin of t. VIII. Ventral margin of dorsal anal lobe with one tiny and several long bristles per side, lowest long bristle situated above apex of reduced ventro-lateral extension. Spermatheca with hilla penetrating deeply into elongate bulga. Hilla with apex slightly tapered, similar to bulga in length. Anal stylet abruptly tapered, 2x as long as its basal width.

length. Male 2.5-3.0 mm; female 2.75-3.0 mm.
Type Material
Argentina:
Cerro Microondas, 5 km s. s.e. l'Estacion Perito Moreno, Provincia Rio Negro, 1370 m, ex. Euneomys sp., 3-IV-86, leg. M. Gallardo, holotype, allotype, 5M 1F paratypes.
Ibid., except ex. Akodon longipilus, 2M 3F paratypes. Holotype, allotype, 5M 10F paratypes, (JCB), 1M 1F, (RL), and 1M 3F, (Instituto de Ecologia y Evolucion, Valdivia, Chile).

Additional Material
Chile:
La Parva, Santiago Province, 3000 m, ex. Euneomys noe, leg. T. E., 3F, (RL).

Plocopsylla nungui Schramm and Lewis, 1987
(Figs. 50-53)

Diagnosis. Quite similar to P. phobos, P. heros and P. thor, this species possesses four spines of normal length in the genal comb and lacks a complete or incomplete false comb along the posterior margin of the hind tibia. Plocopsylla nungui can be separated by the anterior margin of the grena which is blunt or, at most, has an upper one-half that is convex but never with a concave lower margin as is found in P. phobos, P. heros and P. thor. Males can be distinguished from males of the other three species by the absence of an accessory bristle. Females differ from females of the other three species by having three, not two, antepygidal bristles.

Description. HEAD. Pretenidial width of helmet narrower
than length of longest helmet spine. Helmet spines basally notched. Dorsal helmet striations anastomosing into groups of three to six, more ventral striations often not fused. Both sexes generally with 14 helmet spines. Anterior margin of gena blunt or upper one-half convex but lower one-half straight. Both sexes with two to four well-separated submarginal bristles usually positioned on upper one-half of anterior margin of gena. Male with one to three and female with two or three smaller, lateral bristles between two long genal bristles. Genal comb of four spines. Genal lobe broad, rounded, expanded distally. Preoral tuber campanulate, height at midpoint similar to basal length. First antennal segment with small mesal bristle near base, usually longer bristle located distally on dorsal margin or mesal surface. Antennal bristles arise along or just ahead of concave distal margin of second segment, with longest bristles barely reaching clava. THORAX. Pronotum with two rows of bristles, with anterior row of intermediate-length bristles, posterior row consisting of alternating long bristles and intercalaries, occasionally both rows preceded by several scattered bristles. Pronotal comb usually with 16 to 18 spines, with somewhat pointed lobe below ventralmost spine, shorter than longest pronotal spines. Meso- and metanotum each with two rows of bristles, similar to pronotum. Usually with two to four mesonotal pseudosetae per side. LEGS. Dorso-apical bristles of hind tibia usually with the following bristle arrangement: 3-2-3-3-3-3-(3 or 4). Lateral surface of hind tibia with

Sternites II-VI each with row of several bristles in a row per side, with st. VII and st. VIII of female having scattered bristles of varying lengths. Male with one antepygidial bristle per side, lacking accessory bristle. Female with three antepygidial bristles per side.

**MODIFIED ABDOMINAL SEGMENTS OF MALE (Figs. 51-53).** Tergite VIII ovate with thick, relatively short apodeme. Subsensillar sclerite with hairlike apical bristle, roughly one-half length of antepygidial bristle. Proximal arm of st. IX with posterior margin undulating, with membranous mesal lobe below base of arm. Distal arm with two well-separated spiniform bristles on posterior margin, the lower elongate and blunt, upper short and blunt, with several hairlike apical bristles. Fixed process of clasper narrow, with apical fringe of 11 large bristles; with gaps usually separating fifth bristle, with smaller lateral bristles near fringe. Mesal process with dorsal margin elongate, rectangular, visible in whole mount due to sclerotization, with membranous ventral lobe at proximal end that is visible in dissected material. Movable process triangular, with posterior margin between dorsal apex and caudo-ventral angle including...
prominent projection at midpoint, with submarginal spiniform bristle at caudo-ventral angle. Features involving movable process, st. IX and clasper place *P. nungui* in Subgroup A-1 of Species Group A. Aedeagal apodeme broad, with proximal end blunt, with neck region having pronounced curve and constriction. Aedeagal pouch with ventral margin smooth. Sclerotized inner tube uniformly broad, curving roughly 45 degrees at midpoint.

**MODIFIED ABDOMINAL SEGMENTS OF FEMALE (Fig. 50).** Dorsal anal lobe with one tiny and several long bristles per side, lowest long bristle usually just above apex of broad ventro-lateral extension. Spermatheca with hilla penetrating short distance into reniform bulga. Hilla widest at midpoint, noticeably shorter than bulga. Anal stylet 3 to 4x as long as its basal width.

LENGTH. Both sexes 2.5 mm.

**Type Material**
Ecuador:
Papallacta, 1.4 km E, Napo Province, 3040m, ex. *Thomasomys erro*, 3-V-80, leg. R. S. Voss, male holotype, female allotype, 8M 6F paratypes, (VJT).

**Host Synonymy**
*Thomasomys erro* = ?
Plocopsylla pallas (Rothschild, 1814)
(Fig. 5)

Plocopsylla pallas (Rothschild). Hopkins and Rothschild, 1856, An illustrated catalogue of the Rothschild Collection of fleas (Siphonaptera) in the British Museum (Natural History. Vol. II. Cambridge University Press, London. pp. 154, 158, figs. 80, 248, pl. 7A.

Diagnosis. Plocopsylla pallas, by having six spines in the genal comb and by having helmet spines that are not basally notched, resembles P. anderleini and P. viracocha. It differs from both species by having a prectenidial width of the helmet that is more than 2× the length of the longest helmet spines. It also differs from P. viracocha in the arrangement of bristles along the dorsal margin of the hind tibia. In P. pallas, the lowest of three bristles in the fourth to sixth notches from the proximal end of the hind tibia is usually separated from the other two bristles by a gap less than the basal width of the lowest bristle. In P. viracocha this gap is equal to or greater than the basal width of the lowest bristle. Males of P. pallas are unknown. Females differ by having four long, well-separated bristles below the lobe on the posterior margin of t. VIII rather than three long, well-separated bristles as in females of P.
viracocha or five or six long bristles in a row as in females of
P. enderleini.

Description of female. HEAD. Prectenidial width of helmet
greater than 2x length of longest helmet spine. Helmet spines
not basally notched. Helmet striations not anastomosing,
frequently not reaching bases of helmet spines. Anterior margin
of gena convex. With seven or eight well-separated submarginal
bristles along anterior margin of gena, with middle bristles set
well back from margin. Four smaller bristles between two long
genal bristles. Genal comb of six spines, with genal spine
slightly more than one-half length of adjacent spine, separated
from adjacent spine by a gap roughly equal to basal width of
genal spine. Narrow genal lobe truncate, with slight distal
expansion. Preoral tuber elongate, basal length more than 2x the
height at midpoint. Antennal bristles arise along pronounced
convex distal margin of second segment, with longest bristles
extending beyond apex of clava. THORAX. Pronotum with two rows
of bristles, with anterior row of intermediate-length bristles,
posterior row of alternating long bristles and intercalaries.
Pronotal comb usually of 24 to 26 spines, with small, narrow lobe
below ventralmost spine, much less than one-half length of that
spine. Meso- and metanotum with two rows of bristles, similar to
those of pronotum, scattered bristles may precede rows on
mesonotum. Usually two mesonotal pseudosetae per side. LEGS.
Dorsal notches of hind tibia generally with the following bristle
arrangement: 3-2-3-3-3-3-4. Lowest of three bristles in fourth
to sixth dorsal notches of hind tibia from proximal end usually
separated from other two bristles by a gap less than basal width
of lowest bristle. Lateral surface of hind tibia with one row of
bristles that branches distally into two rows. ABDOMEN. Tergites
with two rows of bristles, similar to those of pronotum, with
anterior row reduced on posterior tergites. Marginal spinelets
Sternites II-VI with several long bristles in a row per side,
with st. VII and t. VIII having scattered bristles of varying
lengths. Single elongate antepygidal bristle per side.

MODIFIED ABDOMINAL SEGMENTS OF FEMALE (Fig. 5). Dorsal anal
lobe with one tiny and several long bristles per side. Lowest
long bristle at apex of elongate ventro-lateral extension.
Spermatheca with hilla projecting deeply into elongate bulga.
Hilla slightly shorter than bulga. Anal stylet tapered, roughly
3x as long as its basal width.

LENGTH. Female 2.5-3.5 mm.

Type Material
Peru:
Townsend, female lectotype, (desig. Smit and Wright 1973),
IF paratype, (BM).

Additional Material
Peru:
Carhuamayo, Dept. of Jui, 14500ft, ex. Elig. lapida or
Akodon jeiskii or Phyllotis darwini ssp., 22-II-46, leg.
C. C. Sanborn, IF, (BM).

Host Synonymy

Eligmodontia lapida = (?) Hesperomys lepitus = Calomys lepidus
Plocopsylla phobos Jordan, 1931b  
(Figs. 54-57)

37:135-143, figs. 5-6.


Plocopsylla phobos Jordan. Hopkins and Rothschild, 1956, An  
Illustrated catalogue of the Rothschild Collection of fleas  
(Siphonaptera) in the British Museum (Natural History).  
Vol. II. Cambridge University Press, London. pp. 154,  

No. 5. pp. 69-74.

Nat., Ent. 5(6):105-141.

The female paratype of P. phobos from Cerro de Puntas is  
probably P. phylissae as is the female collected from Guamaní,  
Ecuador. See section on host specificity.

Diagnosis. Plocopsylla phobos, by having four spines of  
normal length in the genal comb but lacking a complete or  
incomplete false comb on the hind tibia, resembles P. nungui, P.  
heros and P. thor. Males differ from males of P. nungui by the  
presence of an accessory bristle, from P. heros by the absence of  
a modified t. VIII with a posterior extension, and from P. thor  
by the rectangular, rather than wedge-shaped, lower spiniform  
bristle on st. IX. Females differ from those of P. nungui by  
having two, not three, antepygidal bristles, from those of P.  
heros by having usually an anal stylet 3 to 4x long as its basal  
width rather than 2.5 to 3x and from those of P. thor usually by  
having four to six submarginal bristles along the anterior margin  
of the gena and two to four smaller, lateral bristles between two  
long genal bristles, rather than zero to three submarginal  
bristles and two smaller, lateral bristles.
Description. HEAD. Prepectal width of helmet less than length of longest helmet spine. Helmet spines basally notched. Individual helmet striations extending to points between two adjacent helmet spines while striations between them may be posteriorly fused. Both sexes usually with 13 or 14 helmet spines. Anterior margin of gena with upper one-half convex and concave lower one-half frequently creating an angular or knoblike cephalo-ventral angle. Both sexes usually with three to six submarginal bristles along upper one-half of anterior margin of gena. Both sexes usually with one to three smaller, lateral bristles between two long genal bristles. Genal comb of four spines. Genal lobe rounded, expanded distally. Antennal bristles arise along or slightly ahead of concave distal margin of second segment, with longest bristles not reaching midpoint of clava. THORAX. Pronotum with two rows of bristles; anterior row of intermediate-length bristles, posterior row of alternating long bristles and intercalaries. Pronotal comb of 14 to 16 spines, with somewhat pointed lobe below ventralmost spine, similar in length to that spine. Meso- and metanotum with two rows of bristles, similar to those of pronotum. Usually two mesonotal pseudosetae per side. LEGS. Dorsal notches of hind tibia usually with the following bristle arrangement: 3-2-2-3-3-3-3 (3 or 4). Lateral surface of hind tibia with bristles that usually branch distally into two rows. ABDOMEN. Tergites I-VII with two rows of bristles, similar to those of pronotum, with anterior row reduced on posterior tergites, may be
lacking on t. VI and/or t. VII of male. Marginal spinelets of anterior tergites of male: I 3-4/2-4, II 1-4/0-4, III 1-4/-1-4, IV 0-3/0-3. Marginal spinelets of anterior tergites of female: I 2-5/2-5, II 2-5/2-5, III 1-4/1-5, IV 0-4/0-3. Sternites II-VI with several bristles in a row per side, better developed in female. Sternites VII and VIII of female having scattered bristles of varying lengths. Male with one short, flattened antepygidal bristle per side, slightly longer than hairlike accessory bristle, both on pedestal. Female with two long antepygidal bristles per side.

MODIFIED ABDOMINAL SEGMENTS OF MALE (Figs. 55-57). Long, curved, subapical bristle below blunt apex of subsensilial sclerite. Proximal arm of st. IX extremely narrow, curving at midpoint, with blunt apex, and with membranous, mesal lobe below base of arm. Distal arm of st. IX with two blunt spiniform bristles midway to pointed apex, lower spiniform bristle roughly 2x length of upper one, slightly curved. Fixed process usually with 11 or 12 large bristles in apical fringe of clasper, with gaps usually isolating fourth bristle, with smaller lateral and marginal bristles near fringe. Mesal process with dorsal margin elongate, rectangular, visible in whole mount due to sclerotization, with membranous ventral lobe bearing a sharp, cephalo-ventral projection at proximal end, lobe visible in dissected material. Movable process with posterior margin having prominent angular projection midway between dorsal apex and caudo-ventral angle, with large, submarginal spiniform bristle
extending beyond posterior margin above caudo-ventral margin. Most similar to that of *P. scotinomi*. Specific characters of movable process, st. IX and clasper place *P. phobos* in Subgroup A-1 in Species Group A. Aedeagal apodeme elongate, with proximal end blunt, with neck region having pronounced curve and constriction. Aedeagal pouch with ventral margin smooth. Sclerotized inner tube uniformly broad, curving at midpoint about 45 degrees.

**MODIFIED ABDOMINAL SEGMENTS OF FEMALE** *(Fig. 54)*. Dorsal anal lobe with one tiny and several long bristles per side, lowest long bristle set well above somewhat reduced apex of ventro-lateral extension. Spermatheca with hilla not projecting into bulga. Hilla of uniform width, similar in length to bulga. Anal stylet cylindrical, roughly 3 to 4x as long as its basal width.

**LENGTH.** Male 2.0 mm; female 2.0-2.25 mm.

**Type Material**
**Ecuador:**

**Additional Material**
**Ecuador:**
Papallacta, old Santo Domingo Road, Napo Province, ex.
*Neusticomys monticolus*, 3-V-60, leg. R. S. Voss, 1M, (VJT).
Ibid., except ex. *Caenolestes* sp., 1M SF, (VJT).
Papallacta, 8.2 Km W, Napo Province, 3600m, ex. *Thomasomys baeops*, 3-V-80, leg. R. S. Voss, SM 10F, (VJT).

Papallacta, 7.5 Km W, Napo Province, 3690m, ex. *Cryptotis thomasi*, 3-V-80, leg. R. S. Voss, IM 3F, (VJT).

Papallacta 1.4 Km E, Napo Province, 3040m, ex. *Thomasomys baeops*, 3-V-80, leg. R. S. Voss, IF, (VJT).
Vicinity of Papallacta, no data available, IF, (VJT).
Ibid., except 20-VI-56, 4M SF, (BM).
Ibid., except 25-VI-56, 2M SF, (BM).

Colombia:

Host Synonymy

*Thomasomys sylvestris* = ?
*Thomasomys caudivarius* = ?

*Plocopsylla phyllisae* Smit, 1953
(Figs. 58-61)


*Plocopsylla phyllisae* differs from all other species by having one to four extremely short genal comb spines...
that are not much longer than wide. These spines vary in number with most males having three or four and most females having two or three. Of the specimens examined, a relatively large number of them had the total number of spines in the genal comb on each side of the head differing by one. For example, a single specimen could have a genal comb containing three spines on one side of its head and a comb of two or four spines on the other side of the head.

Description. HEAD. Prectenidial width of helmet much less than length of longest helmet spine. Helmet striation pattern with upper striations usually anastomosing into groups of four or five, lower striations often not fused. Usually 14 basally-notched helmet spines. Anterior margin of gena with upper one-half convex, lower one-half concave, frequently with a pronounced knoblike or angular cephalo-ventral angle. Both sexes usually with four to eight submarginal bristles associated with upper one-half of anterior margin of gena. Both sexes with one to three smaller, lateral bristles between two long genal bristles. Genal comb containing one to four extremely short spines, slightly longer than wide. Genal lobe narrow, expanded distally. Preoral tuber campanulate, basal length similar to height at midpoint. Antennal bristles arise along or just ahead of concave distal margin of second segment, with longest bristles barely reaching clava. THORAX. Pronotum with two rows of bristles; anterior row of intermediate-length bristles, posterior row of alternating long bristles and intercalaries. Pronotal
comb usually of 14 to 16 short spines, roughly one-half length of longest helmet spine, with blunt lobe below ventralmost spine, similar in length to that spine. Meso- and metanotum with two rows of bristles, similar to those of pronotum. Usually with two or three mesonotal pseudosetae per side. LEGS. Dorsal notches of hind tibia usually with the following bristle arrangement: 3-2-2-3-3-3-3. Lateral surface of hind tibia usually with one row of bristles. ABDOMEN. Tergites with two rows of bristles, similar to those of pronotum. Anterior row usually reduced on posterior tergites, or, may be grouped on t. VII of female. Marginal spinelets of anterior tergites of male: I 3-5/2-5, II 2-5/2-5, III 2-6/2-4, IV 1-5/2-4, V 0-2/0-2. Marginal spinelets of anterior tergites of female: I 3-7/2-7, II 2-7/2-7, III 2-5/2-6, IV 1-6/1-5, V 0-2/0-2. Sternites II-VI with several bristles in a row per side, not better developed in female. Male with st. VII often with single bristle per side, female with scattered bristles of varying lengths on st. VII and VIII. Male with one tiny, stout antepygidial bristle per side, shorter than hairlike accessory bristle. Female with two relatively short antepygidial bristles per side, no more than 1.5x longer than length of anal stylet.

MODIFIED ABDOMINAL SEGMENTS OF MALE (Figs. 59-61).

Subsensilial sclerite with curved, hairlike subapical bristle, much longer than antepygidial or accessory bristles. Proximal arm of st. IX with pronounced, undulating posterior margin, with membranous, mesal lobe below base of arm. Distal arm of st. IX
with two spiniform bristles, lower spiniform bristle elongate, widening near apex, upper blunt. Fixed process fringe consisting of 12 or 13 large bristles, with fifth and sixth bristles isolated by gaps, and with smaller marginal and lateral bristles near fringe. Mesal process with dorsal region elongate, rectangular, visible in whole mount due to sclerotization, with membranous ventral lobe at proximal end, visible in dissected material. Movable process triangular, with posterior margin having angular projection midway between distal apex and caudo-ventral angle, with submarginal spiniform bristle having narrowed base extending beyond membranous outer surface at caudo-ventral angle. Characters of movable process, st. IX and clasper place *P. phyllisae* in Subgroup A-1 in Species Group A. Aedeagal apodeme broad, with proximal end blunt, with neck region having pronounced curve and constriction. Aedeagal pouch with ventral margin smooth. Sclerotized inner tube of uniform width, curving at midpoint and apex forming two right angles.

**MODIFIED ABDOMINAL SEGMENTS OF FEMALE (Fig. 58).** Dorsal anal lobe with one tiny and several long bristles per side, lowest long bristle set well above broad apex of ventro-lateral extension. Spermatheca with hilla barely entering reniform bulga. Hilla widest toward anterior end, shorter in length than bulga. Anal stylet broad, 2x as long as its basal width.

**LENGTH.** Male 1.5-2.0 mm; female 2.0-2.25 mm.
Type Material
Ecuador:
Additional Material
Ecuador:
   Papallacta, 6.2 Km W, Napo Province, 3600m, ex. *Caenolestes fuliginosus*, 3-V-80, leg. R. G. Voss, 42M 53F, (VJT).
   Ibid., except 3-VI-80, 1F.
Colombia:
   Ibid., except no date, 1M, (EM).

**Plocopsylla reigi** Beaucournu and Gallardo, 1978
(Figs. 62-66)


**Diagnosis.** *Plocopsylla reigi*, with five spines in the genal comb, the genal spine separated from the adjacent spine in the comb by a gap, at most, slightly wider than the basal width of the genal spine and by having a proctenidial helmet width that is similar to the length of the longest helmet spine, is similar to *P. lewisi* and *P. wolffsohnii*. It differs from *P. lewisi* by having helmet spines with prominent basal notches. It can be usually separated from *P. wolffsohnii* by comparing the basal width of the...
genal spine to the width of the gap separating the genal spine from the adjacent spine in the comb. In P. reigi, the gap is always more than one-half the basal width of the genal spine. In P. wolffsohni, the gap is usually less than one-half the basal width of the genal spine. Males of P. reigi differ from males of P. lewisi by having an elongate movable process with two spiniform bristles rather than a triangular movable process with one spiniform bristle. Males also differ from males of P. wolffsohni by the absence of a prominent mesal lobe on the clasper preceding the apical fringe. Females of P. reigi differ from females of P. lewisi by having a long bristle at the apex of the ventro-lateral extension of the dorsal anal lobe rather than a bristle set well-above the apex. They differ from females of P. wolffsohni by having a stout anal stylet that is usually about 2x as long as its basal width rather than usually tapered and 2.5 to 3x as long as its basal width.

Description. HEAD. Prectenidial width of helmet similar to length of longest helmet spine. Helmet spines basally notched. Helmet striations usually not fused into groups posteriorly, with noticeable gap usually separating striations from bases of helmet spines. Both sexes with 11 or 12 helmet spines. Anterior margin of gena convex, with small, rounded protuberance on lower one-half of margin; if anterior margin is convex but undulating, then small rounded protuberance is more pronounced than others. Male with 5 to 10 well-separated submarginal bristles that can extend linearly from dorsal to ventral margins of gena, female
with three to nine. Both sexes with three or four smaller, lateral bristles between two long genal bristles. Genal comb of five spines, with genal spine slightly shorter than adjacent spine in comb, separated from adjacent spine by a gap more than one-half its basal width. Genal lobe rounded, expanded distally. Antennal bristles arise along or slightly ahead of concave distal margin of second segment, with longest bristles extending beyond apex of clava. THORAX. Pronotum with two rows of bristles; anterior row of intermediate-length bristles, posterior row of alternating long bristles and intercalaries. Pronotal comb of 16 to 24 slender spines, with large lobe below ventralmost spine, more than one-half length of that spine. Meso- and metanotum each with two rows of bristles, similar to those of pronotum. Females may have several mesonotal bristles preceding these two rows. Usually with two mesonotal pseudosetae per side. LEGS. Dorsal notches of hind tibia usually with the following bristle arrangement: 3-2-2-3-3-3-3. Lateral surface of hind tibia with variable arrangement of bristles, often with one row that broadens distally into two or three rows. ABDOMEN. Tergites I-IV or V of male and all tergites of female with two rows of bristles, similar to those of pronotum, with anterior row reduced or lacking on posterior tergites. Marginal spinelets of anterior tergites of male: I 3-4/3-4, II 2-3/2, III 2-3/2-3, IV 2-3/2, V 1-2/1-2. Marginal spinelets of anterior tergites of female: I 3-5/2-5, II 2-4/2-4, III 1-3/1-3, IV 1-2/1-2, V 0-1/0-1. Sternites II-VII of male and II-VI of female with several
bristles in a row per side, better developed in female. Female with scattered bristles of varying lengths on st. VII and t. VIII. Male with one antepygidial bristle, usually flattened, and one short, stout accessory bristle per side, both on prominent pedestal. Female with one antepygidial bristle per side.

**MODIFIED ABDOMINAL SEGMENTS OF MALE (Figs. 63-66).**

Subsensilal sclerite tapered, almost forming pedestal for stout apical bristle. Sternite IX with proximal arm thick, with distal arm having two pairs of spiniform bristles, each pair consisting of similar bristles. Region broad where sternite arms join, with ventral margin blunt. Clasper broad, with manubrium and t. IX forming a somewhat squared-off notch. Fringe on fixed process consisting of 18 to 35 evenly-spaced bristles along blunt apical margin, with smaller lateral and marginal bristles near fringe. Fixed process with small, mesal lobe overlapped by dorsal-most bristles of fringe, may not be visible in whole mount. Mesal lobe connects anteriorly with large mesal bristle that does not arise from small mesal lobe as in *P. chiris*. Mesal process with dorsal margin rectangular, with dorsal extensions at both ends, visible in whole mount due to sclerotization, with membranous, midventral lobe, visible in dissected material. Movable process elongate, with dorsal winglike process opposite ventral spiniform bristle, with tiny spiniform bristle on rectangular pedestal on dorsal margin preceding base of apical spiniform bristle. Specific characters involving movable process, st. IX and clasper place *P. reigi* in Subgroup B-1 of Species Group B. Aedeagal
apodeme elongate, with proximal end pointed, with neck region having pronounced curve and constriction. Ventral margin of aedeagal pouch with angular protuberance near proximal end. Sclerotized inner tube broadest basally, curving at midpoint about 45 degrees.

MODIFIED ABDOMINAL SEGMENTS OF FEMALE (Fig. 62). Dorsal anal lobe with one tiny and several long bristles per side, lowest long bristle at apex of broad ventro-lateral extension. Spermatheca with hilla not projecting into elongate bulga. Hilla of uniform width, much shorter than bulga. Anal stylet stout, 2x as long as basal width.

LENGTH. Male 2.25-2.5 mm; female 2.0-2.5 mm.

Type Material
Ibid., except 20-I-74, 1M paratype (JCB, BM or U. A. de Chile).

Additional Material
Trappist Monastery, 2.5 Km NE Cerro Manquehue, Santiago Province, ex. Octodon degus, 30-V-76, leg. R. E. Martin, IM, (RL).
Plocopsylla scotinomi Tipton and Mendez, 1966
(Figs. 67-70)

Plocopsylla scotinomi, Tipton and Mendez, 1966, Ectoparasites of Panama. pp. 322-324, pls. 92-93.

Diagnosis. Plocopsylla scotinomi differs from all species except P. ulysses in having the bristles along the dorsal margin of the hind tibia forming an incomplete false comb. It also differs in having 14 to 16 spines in the pronotal comb and lacking submarginal bristles along the anterior margin of the gena. Plocopsylla ulysses have 18 to 20 pronotal spines and usually from one to four submarginal bristles. Males of P. scotinomi have a short antepygidal bristle that is similar in length to the hairlike accessory bristle. In contrast, males of P. ulysses have an antepygidal bristle that is roughly 4x longer than the hairlike accessory bristle. Females of P. scotinomi have a prectenial helmet width no more than three-fourths the length of the longest helmet spine, unlike females of P. ulysses which have a prectenial helmet width roughly similar in length to the longest helmet spine.

Description. HEAD. Prectenial width of helmet at most three-fourths length of longest helmet spine in female, only slightly shorter in the one male specimen. Helmet striations not fused, striations elongate, reaching bases of helmet spines. Both sexes with 14 basally-notched helmet spines. Anterior margin of gena blunt, lower one-half may be slightly concave.
Both sexes lack submarginal bristles along anterior margin of gena. Both sexes with four or five smaller bristles between two long genal bristles. Four genal spines. Genal lobe wide, truncate, expanded distally. Antennal bristles arise along or slightly ahead of concave distal margin of second segment, with longest bristles barely reaching proximal end of clava. THORAX. Pronotum with two rows of bristles; anterior row of intermediate-length bristles, posterior row of alternating long bristles and intercalaries. Pronotal comb of 14 to 16 short spines, similar in length to genal comb spines, with broad lobe below ventralmost pronotal spine, more than one-half length of that spine. Meso- and metanotum with two rows of bristles, similar to those of pronotum. Usually with three mesonotal pseudosetae per side. LEGS. Bristles on dorsal margin of hind tibia forming incomplete false comb. Lateral surface of hind tibia with essentially one column of bristles. ABDOMEN. Tergites with 2 rows of bristles, similar to pronotum, with anterior row reduced in posterior tergites of male. Marginal spinelets of anterior tergites of male: I 3/3, II 1/1, III 1/2. Marginal spinelets of anterior tergites of female: I 2-5/3, II 2/2-3, III 1-2/1-2. Sterntes II-VI with several bristles in a row per side, better developed in female, with sternite VII and t. VIII of female having scattered bristles of varying lengths. Male with one stout antepygidal bristle per side, slightly shorter than slender accessory bristle. Female with two antepygidal bristles per side.
MODIFIED ABDOMINAL SEGMENTS OF MALE (Figs. 68-70).

Subsensillar sclerite with apical bristle. Proximal arm of st. IX with posterior margin undulating, with membranous mesal lobe below base of arm. Distal arm of st. IX with lower spiniform bristle elongate and blunt, at least 4x longer than upper spiniform bristle, with several hairlike apical bristles. Fixed process narrow, somewhat apically pointed, with fringe consisting of approximately 12 large bristles positioned mainly on dorsal side of clasper apex, with those on dorsal side spaced slightly farther apart. Smaller marginal and lateral bristles scattered near fringe. Exact shape of mesal process questionable in whole mount, with sclerotized dorsal region appearing rectangular, with small, triangular, midventral process. Movable process triangular, with posterior margin consisting of angular projection midway between distal apex and caudo-ventral angle, with submarginal spiniform bristle projecting between pronounced posterior angle and caudo-ventral angle, similar to that of *P. phobos*. Certain features involving movable process, st. IX and clasper place *P. scotinomi* in Subgroup A-1 of Species Group A. Aedeagal apodeme elongate, with proximal end blunt, with neck region having pronounced curve and constriction. Aedeagal pouch with ventral margin smooth. Sclerotized inner tube broad, with apex somewhat tapered, with curve at midpoint almost forming right angle.

MODIFIED ABDOMINAL SEGMENTS OF FEMALE (Fig. 67). Dorsal anal lobe with one tiny and several long bristles per side,
lowest long bristle situated near, but above apex of broad ventro-lateral extension. Spermatheca with hilla entering elongate bulga for only short distance. Hilla uniformly wide, much shorter than bulga. Anal stylet 2.5 to 3x as long as its basal width.

LENGTH. Male 2.0 mm; female 2.0-2.5 mm.

Type Material
Panama:
Boquete Trail, about 5 miles beyond Cerro Punta (Chiriqui), 7000ft, ex. Scotinomys xerampelinus, 2-V-81, leg. C. M. Keenan and C. E. Yunke, male holotype, female allotype, (USNM).
Ibid., except 6800ft, 7-I-81, 1F paratype*.
Ibid., except 7750ft, 1M paratype*, (FM).
*One pair of paratypes deposited in each of the following: VJT, RT, BM, FM and GML.

Plocopsylla thor Johnson, 1857
(Figs. 71-74)


Diagnosis. Plocopsylla thor resembles P. nungui, P. phobos and P. heros by having four spines of normal length in the genal comb but lacking a complete or incomplete false comb along the posterior margin of the hind tibia. Males with an unmodified t.
VIII and a wedge-shaped rather than elongate lower spiniform bristle on st. IX differ from males of _P. heros_ and _P. phobos_, respectively. Males differ from males of _P. nungui_ by the presence of an accessory bristle. Females usually have zero to three submarginal bristles along the anterior margin of the gena and two smaller lateral bristles between the two long genal bristles while in females of _P. phobos_ and _P. heros_ there are usually four to six submarginal bristles and two to four smaller lateral bristles between the two long genal bristles. They differ from females of _P. nungui_ by the presence of two, not three, antepygidial bristles.

Description. HEAD. Pretendentidal width of helmet roughly three-fourths length of longest helmet spine. Helmet striations can be fused posteriorly into groups of five to seven or remain distinct. Usually 13 basally-notched helmet spines. Anterior margin of gena with upper one-half convex, lower one-half concave, with cephalo-ventral angle somewhat Knoblike or angular. Male with four submarginal bristles on upper one-half of anterior margin of gena, female with zero to three submarginal bristles. Male with one smaller, lateral bristle between two long genal bristles, female with two. Genal comb of four spines. Genal lobe broad, truncate, distally expanded. Antennal bristles arise along concave distal margin of second segment, with longest bristles extending to midpoint of clava. THORAK. Pronotum with two rows of bristles; anterior row of intermediate-length bristles, posterior row of alternating long bristles and
intercalaries. Pronotal comb of 14 to 18 spines, broad lobe below ventralmost spine, subequal in length to that spine. Meso- and metanotum each with two rows of bristles, similar to those of pronotum. Usually two mesonotal pseudosetae per side. LEGS. Dorsal notches of hind tibia usually with the following bristle arrangement: 3-2-2-3-3-3-3. Lateral surface of hind tibia with one row of bristles. ABDOMEN. Tergites with two rows of bristles, similar to those of pronotum; anterior row reduced on posterior tergites of male. Marginal spinelets of anterior tergites of male: I 3/2, II 3/3, III 2/3, IV 1/1. Marginal spinelets of anterior tergites of female: I 3-4/3-5, II 3-4/3, III 1-2/0-2, IV 0-1/0-1. Sternites II-VI with several bristles in a row per side, with st. VII and t. VIII of female having scattered bristles of varying lengths. Males with one relatively short antepygidal bristle per side, lacking accessory bristle. Female with two long antepygidal bristles per side.

MODIFIED ABDOMINAL SEGMENTS OF MALE (Figs. 72-74).

Subsensillial sclerite with relatively long apical bristle, shorter than antepygidal bristle. Proximal arm of st. IX with posterior margin undulating, with membranous mesal lobe below base of arm. Distal arm of st. IX with two small, overlapping spiniform bristles set just above base of lower wedge-shaped spiniform bristle, with narrowed apex of distal arm with several hairlike bristles. Apical fringe of fixed process usually of 10 large bristles, with ventralmost close set, with smaller lateral and marginal bristles near fringe. Mesal process with dorsal
region elongate, with proximal end expanded dorsally, visible in whole mount due to sclerotization, with membranous, ventral lobe at proximal end, visible in dissected material. Movable process triangular, posterior margin with angular projection between dorsal apex and caudo-ventral angle, with single submarginal bristle set above caudo-ventral angle, extending beyond posterior margin. Characters of movable process, st. IX and clasper place *P. thor* in Subgroup A-1 of Species Group A. Aedeagal apodeme elongate, with proximal end blunt, with neck region having pronounced curve and constriction. Aedeagal pouch with ventral margin smooth. Sclerotized inner tube uniformly broad, with slight constriction prior to apex, curve at midpoint forming 45 degree angle.

**MODIFIED ABDOMINAL SEGMENTS OF FEMALE (Fig. 71).** Dorsal anal lobe with one tiny and several long bristles per side, lowest long bristle set well above elongate apex of ventro-lateral extension. Spermatheca with hilla barely entering reniform bulga. Hilla of uniform width, somewhat shorter than bulga. Anal stylet narrow, roughly 4x as long as its basal width.

**LENGTH.** Male 2.0-2.5 mm; female 2.0-2.75 mm.

**Type Material**

Colombia:
San Agustin, San Antonio, behind Rio Magdalena (Cordillera Central), Dept. of Huila, 2200m, ex. *Oryzomys (Oryzomys) albigularis* ssp., 27-VIII-51, leg. P. Hershkovitz, male holotype, (FM).
Ibid., except ex. *Thomasomys* sp. (? laniger), no date, female
allotype, (FM), IM 3F paratypes, (RT), IF paratype, (BM).

Additional Material

Colombia:
Laguna de La Cocha, Dept. Marino, 2700m, ex. Thomasomys cinereiventer, 18-IV-68, IF, (EM).
Ibid., except 19-IV-68, IF, (EM).

Ecuador:

_Plocopsylla traubi_ Del Ponte, 1968
(Fig. 8)

30(1-4):115-120, figs. 1, 3-5, 9.


_Diagnosis._ _Plocopsylla traubi_, by having basally-notched helmet spines and five spines in the genal comb with the genal spine separated by a gap at least 1.5x wider than its basal width, is similar to _P. fuegina_. Males of _P. traubi_ are unknown.
Males of _P. fuegina_ have a flattened antepygidal bristle and a small, stout accessory bristle per side, both on a prominent pedestal. Females have a rectangular notch below the lobe on the posterior margin of t. VIII with bristles arising from the notch. In contrast, females of _P. fuegina_ either lack a notch below the lobe on the posterior margin of t. VIII with several long bristles at the caudo-ventral angle, or the lower margin of the lobe curves downward to meet the ventral margin of t. VIII with several long bristles crowded along curved portion of the margin.

_Description of holotype female._ HEAD. Pretectenidial width of helmet roughly three-fourths length of longest helmet spine.
Helmet striations not fused, with slightly shorter striations located between longer ones extending to bases of any two adjacent helmet spines. Helmet ctenidium of 12 basally-notched spines. Anterior margin of gena convex, slightly truncate with eight submarginal bristles set well-back from anterior margin. Three smaller, lateral bristles between two long genal bristles. Genal comb of five spines, with genal spine more than one-half length of adjacent spine in comb, separated by a gap roughly 1.5x wider than basal width of genal spine. Genal lobe truncate, distally expanded. Antennal bristles arise along concave distal margin of second segment, with longest bristles extending beyond apex of clava. THORAX. Pronotum with two rows of bristles; anterior row of intermediate-length bristles, posterior row of alternating long bristles and intercalaries. Pronotal comb of 18 to 20 spines, with somewhat pointed lobe below ventrallymost spine, similar in length to that spine. Meso- and metanotum with two rows of bristles, similar to those of pronotum. Mesonotum with two pseudosetae per side. LEGS. Dorsal notches of hind tibia usually with the following bristle arrangement: 3-2-3-3-3-3. Lateral surface of hind tibia with one row of bristles that branches distally into a pattern two or three bristles wide.

ABDOMEN. Abdominal tergites with two rows of bristles, similar to those of pronotum. Marginal spinelets of anterior tergites: I 4/4, II 2/2, III 1/2, IV 1/1. Sternites II-VI with several bristles in a row per side, those on st. III-V prominent. Scattered bristles of varying lengths on st. VII and t. VIII of
female. One antepygidal bristle per side.

MODIFIED ABDOMINAL SEGMENTS (Fig. 6). Dorsal anal lobe with one tiny and several long bristles per side, lowest long bristle set well above apex of elongate ventro-lateral extension.

Spermatheca with hilla not entering reniform bulga. Hilla of uniform width, shorter than bulga. Anal stylet somewhat broad, roughly 2x as long as its basal width.

LENGTH. Female 2.5mm.

Type Material
Argentina:
Delta de Parana, (in front of or facing Otamendi), Province of Buenos Aires, 1500 km from Zona de San Carlos de Bariloche, below 50m, ex. Oxymycterus rutilans platensis, 6-I11-I64, leg. E. Massoia, female holotype, IF paratype, (Dept. de NM).

Plocopsylla ulysses Hopkins, 1951
(Figs. 75-78)


Diagnosis. Plocopsylla ulysses can be distinguished from all species except P. scotinomi by the bristles along the dorsal margin of the hind tibia forming an incomplete false comb. It
differs from *P. scotinomi* by having 18 to 20 rather than 14 to 16 pronotal spines and by the presence of submarginal bristles along the anterior margin of the gena that are usually lacking in *P. scotinomi*. Males differ from those of *P. scotinomi* by having an antepygidal bristle that is roughly 4x longer than the hairlike accessory bristle, rather than both structures being similar in length. Holotype lacks accessory bristle. Females have a prectenidial helmet width that is similar in length to the longest helmet spine, unlike females of *P. scotinomi* in which the prectenidial helmet width is roughly three-fourths the length of the longest helmet spine.

Description. HEAD. Prectenidial width of helmet similar to length of longest helmet spine. Helmet striation pattern variable, at least ventralmost striations fused posteriorly. Generally with 14 or 15 basally-notched helmet spines. Anterior margin of gena with upper one-half convex, lower one-half concave, with cephalo-ventral angle often pronounced and Knoblike. Male usually with four or five submarginal bristles on upper one-half of anterior margin of gena, female usually with three to five bristles. Both sexes with one to four smaller, lateral bristles between two long genal bristles. Genal comb with four spines. Genal lobe broad, truncate, expanded distally. Antennal bristles arise along concave distal margin of second segment, with longest bristles barely reaching clava. THORAX. Pronotum with two rows of bristles; anterior row of intermediate-length bristles, posterior row of alternating long
bristles and intercalaries. Pronotal comb of 10 to 20 spines, with broad lobe below ventralmost spine, and slightly shorter than this spine. Meso- and metanotum each with two rows of bristles, similar to those of pronotum. Usually two mesonotal pseudosetae per side. LEGS. Hind tibia with incomplete false comb. Lateral surface of hind tibia with variable bristle pattern. ABDOMEN. Tergites I-III in male and I-VII in female with two rows of bristles, similar to those of pronotum, t. IV-VII of male without anterior row of bristles. Marginal spinelets of anterior tergites of male: I 2-4/2-4, II 3-4/3-4, III 2-4/2-4, IV 0-3/1-4. Marginal spinelets of anterior tergites of female: I 3-5/3-5, II 3-4/3-4, III 1-4/1-3, IV 1-2/0-2. Sternites II-VI with several bristles in a row per side, better developed in female. Female with st. VII and t. VIII with scattered bristles of varying lengths. Male with one antepygidal bristle per side, 4x longer than hairlike accessory bristle, both on pedestal. Holotype male lacks accessory bristle. Female allotype and others with four antepygidal bristles per side, but two or three not uncommon.

MODIFIED ABDOMINAL SEGMENTS OF MALE (Figs. 76-78).

Subsensilial sclerite with slender apical bristle. Proximal arm of st. IX with posterior margin undulating, with membranous, mesal lobe below base of arm. Distal arm of st. IX with lower spiniform bristle elongate and blunt, upper spiniform bristle small and blunt, with several hairlike apical bristles. Fringe on fixed process usually with 9 or 10 large bristles, those on
apex more closely set, with smaller lateral and marginal bristles scattered near fringe. Mesal process with dorsal region elongate, narrow, with small, dorsal projections at both ends, visible in whole mount due to sclerotization, with membranous square lobe along ventral margin of proximal end, visible in dissected material. Movable process triangular, with posterior margin having angular projection closer to caudo-ventral angle than distal apex, with submarginal spiniform bristle projecting between angular projection and caudo-ventral angle. Characters involving movable process, st. IX and clasper place P. ulysses in Subgroup A-1 in Species Group A. Aedeagal apodeme somewhat broad, with proximal end blunt, with neck region having pronounced curve and constriction. Aedeagal apodeme with ventral margin smooth. Sclerotized inner tube slightly tapered apical, curving midway to apex to form 45 degree angle.

MODIFIED ABDOMINAL SEGMENTS OF FEMALE (Fig. 75). Dorsal anal lobe with one tiny and several long bristles per side, lowest long bristle situated well above broad apex of ventro-lateral extension. Spermatheca with hilla penetrating deeply into elongate bulga. Hilla usually broadest at midpoint, noticeably shorter than bulga. Anal stylet 3 to 4x as long as basal width.

LENGTH. Both sexes 2.0-2.5 mm.
Type Material
Ecuador:
Additional Material
Venezuela:
  Merida, 3 Km W Timotes, nr. Paramito, 3172m, ex. Thomasomys lugens, 14-II-66, leg. Peterson Team, IM, (USNM).
  Merida, 4 Km W Timotes, nr. Paramito, 3286m, ex. Thomasomys Ianiger, 10-II-66, leg. Peterson Team, IM, (RL).
  Merida, 5.5 Km E, 2 Km S Tabaq, nr. Middle ReOugio, 2580m, ex. Thomasomys lugens, 14-IV-68, IF, (VJT).
  Tachira State, 35 Km S 22 Km W San Cristobal, Buena Vista, 2400m, ex. Thomasomys hylophilus, 17-III-68, IM IF, (VJT).
  Ibid., except 2355m, 24-III-68, IF, (VJT).
  Ibid., except 2400m, 25-III-68, IM, (VJT).
  Ibid., except 2300m, ex. Thomasomys aureus, 4-III-68, IF, (VJT).
  Ibid., except 2305m, ex. Thomasomys sp., 3-III-68, IM, (VJT).
  Ibid., except 2305m, ex. Akodon bogotensis, 5-III-68, IM, (VJT).
  Ibid., except 2370m, ex. Akodon sp., 3-III-68, leg. Peterson Team, IM, (USNM).
  Ibid., except 2370m, 3-III-68, ex. bird, IF, (VJT).
  Trujillo Hda Misisi, 15 Km E, Trujillo State, 2360m, ex. Thomasomys Ianiger, 24-I-66, leg. Peterson Team, IM, (USNM).
  Calabozo (Embalse de Guarico), 10 Km N, Guarico State, 100m, ex. Tracops cirrhosus, 27-I-68, IM, (USNM).
Colombia:
  Bogota, Boqueron de San Francisco, Cundinamarca div., 3000m, ex. Thomasomys sp., 6-V-52, leg. P. HershKovitz, IF, (RT).

Plocopsylla viracocha Schramm and Lewis, 1987
(Figs. 78-82)

Plocopsylla viracocha. Schramm and Lewis, 1987,

Diagnosis. Plocopsylla viracocha resembles P. pallas and P. enderleini in having six spines in the genal comb and helmet spines that are not basally notched. It may be distinguished from P. enderleini in that the prectenodial width of the helmet is never less than 1.5x the length of the longest helmet spine.
It differs from *P. pallas* by a prectenidial width that never exceeds 2x the length of the longest helmet spine and by the arrangement of bristles along the dorsal margin of the hind tibia. In *P. viracocha*, the lowest of the three bristles in the fourth to sixth notches from the proximal end of the hind tibia is usually separated from the other two bristles by a gap equal to or greater than the basal width of the lowest bristle. In *P. pallas*, this gap is usually less than the basal width of the lowest bristle. The clasper of the male lacks a dorsal lobe preceding the apical fringe as in males of *P. enderleini*. Males of *P. pallas* are unknown. Females have three long, well-separated bristles below the lobe on the posterior margin of t. VIII. In contrast, females of *P. enderleini* have five or six long bristles in this row while females of *P. pallas* have four long, well-separated bristles in this row.

Description. HEAD. Prectenidial width of helmet 1.5 to 2x length of longest helmet spine. Helmet striations reach bases of helmet spines without anastomosing, with individual striations occasionally ending some distance from helmet spines. Usually 14 or 15 helmet spines, not basally notched. Anterior margin of gena convex. Both sexes with 4 to 11 submarginal bristles that usually extend from dorsal to ventral margins of gena. Male with two to four smaller lateral bristles between two long genal bristles, female with two to six smaller bristles. Genal comb of six spines, with genal spine always less than one-half length of adjacent spine in comb, separated by a gap at least equal to
basal width of genal spine. Genal lobe truncate, with slight distal expansion. Campanulate preoral tuber elongate, height roughly one-half the basal length. First antennal segment with one or two tiny mesal bristles near base, distal row of four or five longer bristles curving from dorsal margin across mesal surface. Antennal bristles arise along pronounced convex distal margin of second segment, with longest bristles extending beyond apex of clava. THORAX. Pronotum with three rows of bristles: anterior row of short bristles, middle row of intermediate-length bristles, posterior row of alternating long bristles and intercalaries. Pronotal comb usually of 24 to 26 spines, with small lobe below ventralmost spine, much shorter than pronotal spines. Meso- and metanotum each with three rows of bristles, similar to those of pronotum. Usually with two or three mesonotal pseudosetae. LEGS. Dorso-apical bristles of hind tibia elongate, bristle arrangement usually as follows: 3-2-3-3-3-3-<4 or 5). Lowest of three bristles in fourth to sixth hind tibial notches from proximal end usually separated from other two bristles by a gap equal to or greater than basal width of lowest bristle. Lateral surface of hind tibia usually with row of bristles which branches distally. ABDOMEN. Tergites each with two rows of bristles, similar to those of pronotum, with anterior row containing bristles similar in length but more stout than shorter bristles in posterior row, with posterior row of alternating long bristles and intercalaries. Anterior row of intermediate-length bristles may be missing from t. VII of male.
may be grouped on t. VII of female. Marginal spinelets of
anterior tergites of male: I 3-4/3-5, II 3-5/3-5, III 2-5/3-5,
IV 0-4/0-4. Marginal spinelets of anterior tergites of female:
I 3-7/4-6, II 4-6/3-6, III 3-6/2-6, IV 1-5/1-5. Sternites II-VII
of male and II-VI of female each with several bristles in a row
per per side, better developed in female. Sternite VII and t.
VIII of female with scattered bristles of varying lengths. Male
without antepygidial or accessory bristles. Female with one long
antepygidial bristle per side.

MODIFIED ABDOMINAL SEGMENTS OF MALE (Figs. 80-82). Tergite
VIII ovate, with narrow apodeme more or less straight.
Subsensilial sclerite with long, curved bristle on posterior
margin. Sternite IX strongly resembles that of P. enderleini,
with proximal arm distinctly curved in middle, with distal arm
apically curved, having two thick spiniform bristles preceding
curve with lower spiniform bristle more than 2x longer than upper
spiniform bristle, with several hairlike apical bristles. Fixed
process with apical margin asymmetrical, upper one-half of fringe
of long bristles along concave margin, lower one-half of fringe
along convex margin. Fringe usually consisting of 10 large
bristles, with two ventralmost slightly smaller, with gaps
usually isolating fourth, fifth, and sixth bristles. Smaller
lateral and marginal bristles scattered near fringe. Mesal
process broad, with slight constriction preceding expanded distal
end, similar to those of P. enderleini and P. hector. Movable
process broadly triangular, with submarginal spiniform bristle at
caudo-ventral angle, strongly resembling that of *P. enderleini*. Differs by having dorsal apex rounded off, not abruptly tapered. Specific characters involving movable process, st. IX and clasper place *P. viracocha* along with *P. enderleini* in Subgroup A-3 of Species Group A. Aedeagal apodeme elongate, with blunt proximal end, with neck region having slight curve and constriction. Ventral margin of aedeagal pouch with prominent bulge at midpoint. Sclerotized inner tube broadest at curve with dorsal bulge, apically tapered, curving toward apex about 45 degrees.

**MODIFIED ABDOMINAL SEGMENTS OF FEMALE (Fig. 79).** Posterior margin of t. VIII with three long, well-separated bristles below lobe. Ventral margin of dorsal anal lobe with one tiny and several long bristles per side, lowest long bristle at apex of elongate ventro-lateral extension. Spermatheca with hilla projecting deeply into reniform bulga. Hilla of uniform width, much shorter than bulga. Anal stylet cylindrical, 3x as long as its basal width.

**LENGTH.** Male 3.9 mm; female 3.5 mm.

**Type Material**

**Chile:**

Ibid., ex. mammal, 1M 1F, (RT).


Ibid., except 24-VI-51, 2F, (RT).


Host Synonymy

*Phyllotis arenarius* = ?

**Plocopsylla wolffsohni** (Rothschild, 1909)  
(Figs. 83-86)


Diagnosis. *Plocopsylla wolffsohnii*, by having five spines in the genal comb, with the genal spine separated from the adjacent spine in the comb by a gap, at most, slightly wider than the basal width of the genal spine, and by a prectenidial helmet width similar to the length of the longest helmet spine, resembles both *P. lewisi* and *P. reigi*. It differs from *P. lewisi* by having helmet spines with prominent basal notches. In *P. wolffsohnii*, the gap separating the genal spine from the adjacent spine in the comb is usually less than one-half the basal width of the genal spine. In *P. reigi*, this gap is always more than one-half the basal width of the genal spine. Males of *P. wolffsohnii* have an elongate movable process with two spiniform bristles. In contrast, males of *P. lewisi* have a triangular movable process with one spiniform bristle. Males contrast with those of *P. reigi* by the presence of a prominent mesal lobe preceding the apical fringe on the fixed process of the clasper. Females of *P. wolffsohnii* have a long bristle at the apex of ventro-lateral lobe of the dorsal anal lobe while females of *P. lewisi* have a long bristle set well above this apex. Females usually have a tapered anal stylet that is roughly 2.5 to 3x as long as its basal width while females of *P. reigi* have a broad anal stylet that is roughly 2x as long as its basal width.

Description. HEAD. Prectenidial width of helmet, at most, slightly narrower than longest basally-notched helmet spine. Helmet striations with, at least, dorsal ones posteriorly fused
into groups of about five to eight. Male with 10 or 11 helmet spines, 12 in female. Anterior margin of gena convex, cephalo-ventral margin may project anteriorly farther than cephalo-dorsal margin. Male with four to six submarginal bristles along anterior margin of gena, usually extending from dorsal to ventral margins of gena, female with five to nine bristles. Male with two to five smaller, lateral bristles between two long genal bristles, female with three to four. Genal comb of five spines, with genal spine slightly shorter than adjacent spine in comb, separated by a gap usually less than one-half basal width of genal spine. Genal lobe narrow, rounded, expanded distally. Longest bristles on second antennal segment almost reaching apex of clava.

THORAX. Pronotum with two rows of bristles; anterior row of intermediate-length bristles, posterior row of alternating long bristles and intercalaries. Rows may be preceded by one or more intermediate-length bristles which may appear in a row. Pronotal comb of 18 to 20 spines, with pointed lobe below ventralmost spine, more than one-half length of that spine. Meso- and metanotum each with three rows of bristles, with first two rows of intermediate-length bristles, posterior row of alternating long bristles and intercalaries. Usually with two mesonotal pseudosetae per side. LEGS. Dorsal notches of hind tibia usually with the following bristle arrangement: 3-2-2-3-3-3-4. Lateral surface of hind tibia with bristles in a row that usually branches distally into two rows.

ABDOMEN. Tergites I-VII with two rows of bristles, similar to
those of pronotum. Posterior tergites of male may have anterior row missing or, at most, rudimentary. Marginal spinelets of anterior tergites of male: I 2-4/3-4, II 2-4/3-4, III 1-3/1-3, IV 1-3/1-3, V 1-3/1-2. Marginal spinelets of anterior tergites of female: I 3-4/4-5, II 3-5/3-5, III 2-4/3-6, IV 2-4/2-4, V 0-2/1-2. Sternites II-VII in male and st. II-VI in female with several bristles in a row per side, better developed in female. Sternite VII and t. VIII of female with scattered bristles of varying lengths. Male with one flattened antepygidal bristle and one small accessory bristle per side, both on prominent pedestal. Female with one long antepygidal bristle per side.

**MODIFIED ABDOMINAL SEGMENTS OF MALE (Figs. 64-66).**

Subsensillar sclerite narrowed at apex, creating pedestal for short, stout bristle. Sternite IX with proximal arm thick, with distal arm having two pairs of spiniform bristles. Region broad where arms join, with blunt ventral margin. It differs from the st. IX of the other Group B taxa by the prominent notch between the distal arm and the ventral margin. Fringe on fixed process consisting of 15 to 17 evenly-spaced large bristles, preceded by a prominent mesal lobe, with smaller lateral and marginal bristles scattered near fringe. Mesal process with dorsal region elongate, with prominent dorsal extensions at both ends, visible in whole mount due to sclerotization, with membranous, midventral projection, visible in dissected material. Movable process elongate, with dorsal winglike process opposite ventral spiniform bristle, with second spiniform bristle at apex. Specific
characters associated with movable process, st. IX and clasper place P. wolffsohni in Subgroup B-1 of Species Group B. Aedeagal apodeme elongate, with proximal end pointed, with neck region lacking prominent curve and constriction. Aedeagal pouch with projection at proximal end of ventral margin. Sclerotized inner tube curving to form right angle.

MODIFIED ABDOMINAL SEGMENTS OF FEMALE (Fig. 83). Dorsal anal lobe with one tiny and several long bristles per side, lowest long bristle at apex of ventro-lateral extension. Spermatheca with hilla not entering elongate bulga. Hilla of uniform width, shorter than bulga. Anal stylet tapered, usually 2.5 to 3x as long as basal width.

LENGTH. Male 2.0-2.5 mm; female 2.0-3.0 mm.

Type Material
Chile:
Ibid., ex. Akodon longipilis, 1F paralectotype, <BM>.
Ibid., ex. Phyllotis darwini, 1909, 2F paralectotypes, <BM>.

Additional Material
Chile:

Argentina:
San Pedro, S shore Lake Nahuel Huapi, 21 Km NNW San Carlos de Bariloche, Rio Negro Territory, 810m, ex. Euneomys dabbenei, 8-VII-52, leg. J. M. de la Barrera, 1F, <BM>.
Ibid., except 9-VII-53, 1M 2F, <BM>.
Ibid., except ex. Akodon hirtus modestior, 3-VII-52, 1M, <BM>.
Ibid., except 5-VII-52, 1F, <BM>.
Ibid., except 9-VII-53, 1M 1F, <BM>.

Host Synonymy

*Akodon hirtus modestior* = *Akodon (Abrothrix) hirta suffusa* = ?
*Akodon nucus* = ?
Illustrations
Plocopsylla achilles (Rothschild, 1911).

Figs. 1-4. 1. spermatheca (female). 2. movable process (composite of two males). 3. sternite IX (composite of two males). 4. clasper (composite of two males). Upper line scale for Figs. 3 and 4, lower line scale for Figs. 1 and 2.
**Plocopsylla angusticeps** Mahnert, 1982. Fig. 7-9.

**Plocopsylla pallas** (Rothschild, 1914). Fig. 5.

**Plocopsylla traubi** Del Ponte, 1968. Fig. 6.

Figs. 5-9. Fig. 5. spermatheca (composite of *P. pallas* paralectotype and another female). 6. spermatheca (*P. traubi* holotype female). 7. sternite IX (*P. angusticeps* holotype male). 8. movable process (*P. angusticeps* holotype male). 9. clasper (*P. angusticeps* holotype male). Broken line along mesal process indicates where margin was obscured in undissected holotype but it appeared to have this shape. Upper line scale for Figs. 7 and 9, lower line scale for Figs. 5, 6 and 8.
P. traubi

P. pallas

P. angusticeps

0.1 mm

Figs. 10-13. 10. spermatheca (allotype female). 11. movable process (holotype male). Illustration is incomplete as the dorsal condyle is obscured in the undissected holotype. 12. sternite IX (holotype male). 13. clasper (holotype male). The mesal lobe is based on the undissected holotype. If it has a membranous ventral lobe, it will be evident only in dissected material. Upper line scale for Figs. 12 and 13, lower line scale for Figs. 10 and 11.
P. athena
Plocopsylla chiris (Jordan, 1931a).


Figs. 18-21. 18. spermatheca (allotype female). 19. movable process (holotype male). 20. sternite IX (holotype male). 21. clasper (holotype male). Broken line along margin of mesal process indicates the region obscured in the undissected holotype. It appears to have this shape. Upper line scale for Figs. 20 and 21, lower line scale for Figs. 18 and 19.
P. diana
Plocopsylla enderleini Wagner, 1933.

Figs. 22-25. 22. spermatheca (female). 23. sternite IX (composite of paralectotype and another male). 24. movable process (male). 25. clasper (male). Upper line scale for Fig. 25. middle line scale for Fig. 24. lowest line scale for Figs. 22 and 23.

Plocopsylla hector Jordan, 1931b.

Figs. 30-33. 30. spermatheca (female). 31. movable process (male). 32. sternite IX (composite of two males). 33. clasper (composite of three males). Upper line scale for Figs. 32 and 33. lower line scale for Figs. 30 and 31.
P. hector
Plocopsylla heros Jordan. 1933.

Figs. 34-37. 34. spermatheca (paralectotype female).
35. movable process (male). 36. sternite IX (male).
37. clasper (male). Upper line scale for Figs. 36 and 37. lower line scale for Figs. 34 and 35.
Plocopsylla inti Johnson, 1957.

P. inti

Figs. 42-45. 42. spermatheca (allotype female). 43. movable process (paratype male). 44. sternite IX (composite of two paratype males). 45. clasper (composite of two paratype males). Upper line scale for Figs. 44 and 45, lower line scale for Figs. 42 and 43.
P. kilya

Figs. 46-49. 46. spermatheca (female). 47. movable process (male). 48. sternite IX (male). 49. clasper (male). Upper line scale for Figs. 46 and 48, lower line scale for Figs. 46 and 47.
P. lewisi

Figs. 50-53. 50. spermatheca (allotype female). 51. movable process (paratype male). 52. sternite IX (paratype male). 53. clasper (paratype male). Upper line scale for Figs. 52 and 53. lower line scale for Figs. 50 and 51.
P. nungui
Plocopsylla phobos Jordan, 1931b.

Figs. 54-57. 54. spermatheca (female). 55. movable process (male). 56. sternite IX (male). 57. clasper (male). Upper line scale for Figs. 56 and 57, lower line scale for Figs. 54 and 55.
Plocopsylla phyllisae Smit, 1859.
Figs. 58-61. 58. spermatheca (female). 59. movable process (composite of two males). 60. sternite IX (male). 61. clasper (composite of two males). Upper line scale for Figs. 60 and 61. lower line scale for Figs. 58 and 59.
P. phyllisae

Figs. 62-66. 62. spermatheca (female). 63. movable process (male). 64. sternite IX (male). 65. clasper (composite of paratype and another male). 66. mesal surface of fixed process of clasper showing mesal lobe that is hidden by the dorso-apical bristles of the fringe (male). Upper line scale for Fig. 64, middle line scale for Fig. 65 and lowest line scale for Figs. 62, 63 and 66.
P. reigi
**Plocopsylla scotinomi** Tipton and Mendez, 1966.

Figs. 67-70. 67. spermatheca (paratype female). 68. movable process (paratype male). 69. sternite IX (paratype male). Broken line indicates where the margin of the membranous mesal lobe below the base of proximal arm is obscured in undissected holotype. This is how it appears to be shaped. 70. clasper (paratype male). This is the mesal process in the undissected holotype. If present, a membranous ventral lobe will be visible only in a dissected specimen. Upper line scale for Figs. 68 and 70. lower line scale for Figs. 67 and 68.
P. scotinomi
Plocopsylla thor Johnson, 1957.

Figs. 71-74. 71. spermatheca (allotype female). 72. movable process (holotype male). 73. sternite IX (holotype male). 74. clasper (holotype male). Upper line scale for Figs. 73 and 74. lower line scale for Figs. 71 and 72.
P. thor

0.1 mm
Plocopsylla ulysses Hopkins, 1951.

Figs. 75-78. 75. spermatheca (female). 76. movable process (male). 77. sternite IX (male). 78. clasper (male). Upper line scale for Figs. 77 and 78, lower line scale for Figs. 75 and 76.
P. ulysses
**Plocopsylla viracocha** Schramm and Lewis, 1987.

Figs. 79-82. 79. spermatheca (allotype female). 80. movable process (paratype male). 81. sternite IX (paratype male). 82. clasper (paratype male). Upper line scale for Figs. 81 and 82, lower line scale for Figs. 79 and 80.
P. viracocha
Plocopsylla wolffsohni (Rothschild, 1909).

Figs. 83-86. 83. spermatheca (female). 84. movable process (male). 85. sternite IX (male). 86. clasper (male). Upper line scale for Figs. 85 and 86, lower line scale for Figs. 83 and 84.
P. wolffsohni
DISCUSSION

Host Specificity

There are difficulties in studying host specificity of fleas, including misleading host lists which do not distinguish true or important hosts from accidental associations. Some of these problems cannot be resolved because of inadequate host data, especially for South American collections (Traub 1985).

Host data based on the type series and all examined material are presented in Table 1. Although host data are incomplete, there is a high degree of separation between the hosts of Species Group A and Species Group B taxa. Of 52 identified species of marsupial, insectivore and rodent hosts that are assigned to 21 genera, only the four rodent genera, Euneomys (Coues 1874), Phyllotis (Waterhouse 1837), Oryzomys (Baird 1857) and Akodon (Meyen 1833), are associated with at least one flea species from each of the two species groups. In the case of Euneomys, the host species differ with P. wolffsohni, of Subgroup B-1, collected from E. dabbenei, and P. lewisi, of Subgroup A-2, collected from E. noei. Only in Phyllotis, Oryzomys and possibly Akodon have Plocopsylla from both species groups been collected from the same host species. Oryzomys longicaudatus is a host for both P. hector, of Subgroup A-1, and P. wolffsohni, of Subgroup B-1. Phyllotis darwini is a host for P. inti, of Subgroup A-4, and P. viracocha, of Subgroup A-3, as well as P. chiris, P.
wolffsohni and *P. reigi*, all members of Subgroup B-1. *Akodon olivaceus* is a host for both *P. wolffsohni*, of Subgroup B-1, and *P. angusticeps*, of Subgroup A-2 although Mahnert (1982) noted that the host identification for *P. angusticeps* was questionable. This host separation should be noted as additional host data are obtained. Only extensive collecting will verify whether this host separation is merely an inaccurate generalization based on incomplete and therefore misleading data, or, whether it really exists.

It is difficult to summarize the incomplete host data for *Plocopsylla*. But these data can be compared to trends involving host specificity within the order Siphonaptera. One such generalization involves fleas with some kind of an anterior, vertical row of spines or spiniform bristles. Traub (1980) reported that 27 of 241 genera of fleas (11%) each had at least one species with some type of "crown of thorns" structure such as the stephanocircid helmet and its ctenidium. He noted that the vast majority of these fleas parasitize hosts that are both nocturnal and arboreal/scansorial. He added that there usually is only one such characteristic species of flea parasitizing such a host in a given area, even if closely related species exist throughout the range of that host.

This last observation does not seem to be the case for some of the *Plocopsylla* species. Based on examined material, Table 2 lists the nine instances in which two species, or three species in one instance, appear to have identical collection data.
Although important data such as elevation are sometimes lacking, it still indicates that it would not be too unusual to collect two Plocopsylla species from the same host species at a given site, or even from the same host animal. Such an occurrence seems even more likely considering that two species of marsupials, two species of insectivores and 11 species of rodents are hosts for anywhere from two to five species of Plocopsylla.

There is a strong possibility that this situation has already occurred once, if not twice, in Plocopsylla. The lectotype and lectoallotype of P. chiris were collected from the same host animal. Jordan (1931a) noted that both specimens were similar to P. wolffsohni and had 22 pronotal spines, but the majority of his description focused on specific male and female characters. The sexual dimorphism of these two specimens involving the presence of notches at the bases of the helmet spines and the bristle arrangement along the dorsal margin of the hind tibia went unrecorded, if not unnoticed, by Jordan. Much later, two other females identified as P. chiris were collected that matched the lectoallotype in these two characters. Sexual dimorphism for either character is unknown for any of the 20 Plocopsylla species in which both sexes are known. These three females are so morphologically similar that if they are not P. chiris, they all belong to the same new species. Further consideration of this possibility should include examination of the female specimen identified as P. wolffsohni (Jordan and Rothschild 1914) which Johnson (1957) considered to be P. chiris, as well as the
additional female specimen that Mahnert (1982) identified as *P. chiris* although he noted a slight difference in the shape of the anal stylet.

In a somewhat similar situation, Jordan (1931b) based the description of *P. phobos* on a male collected from *Thomasomya* at Chimborazo, Ecuador, and a female collected "off the same host" at Cerro de Puntas, Ecuador. Both specimens were collected 4V-31 by F. Spillmann. Jordan acknowledged sexual dimorphism in the lengths of the spines in the genal comb with the female specimen having extremely short spines. When Smit (1953) described *P. phyllisae* with its genal comb of characteristically short spines, he suggested the female described as *P. phobos* probably belonged to another species although he did not even suggest *P. phyllisae*.

Smit's interpretation is plausible for several reasons. First, sexual dimorphism involving the lengths of the spines in the genal comb is not known for any of the 20 *Plocopsylla* species for which both sexes are known. Second, the male of *P. phyllisae* is described as being quite similar to *P. phobos* but differing in the chaetotaxy of the hind tibia and in the shape of the middle abdominal terga. Both of these characters are variable for a given species, so females of both species may also appear quite similar to each other. In addition, I have identified a number of undetermined specimens as female *P. phobos*, all of which have genal comb spines with lengths similar to those of male *P. phobos*. One final consideration is that after the original description, another female specimen, now in the British Museum
(Natural History), was identified as P. phobos. Although I have been unable to examine either female, the illustrations of this second female from Guamani, Ecuador, (Hopkins and Rothschild 1956), shows extremely short spines in both the genal and pronotal combs, similar to those of the holotype of P. phyllisae. The fact that this second female has collection data identical to that of the male holotype of P. phyllisae is inconclusive for reasons already mentioned. But it does appear that both of these "P. phobos" females are, in fact, P. phyllisae.

Using host collection data from this study and the terminology of Traub (1985), Plocopsylla species range from ultraspecific to extraordinal in their host specificities. There are seven species that appear to be ultraspecific in that each parasitizes a single host species. These are P. angusticeps, P. athena, P. lewisi, P. nungui, P. pallas, P. scotinomi and P. traubi. Individual collection data from each species are inadequate for establishing host specificities. In fact, four of the seven species each are known from only one to three specimens.

Generalized trends within Siphonaptera involving ultraspecificity were reported by Traub (1985). First, 57% of the mammal hosts of ultraspecific fleas are specialized in habit or structure. Second, virtually all ultraspecific fleas parasitize hosts belonging to monotypic genera or else they do not have any congeners in the immediate area or habitat. Third, there is a high degree of specificity among fleas parasitizing
insectivore and marsupial hosts. Of the 55 species or species-groups associated with insectivore hosts, 45 are either ultraspecific or generispecific. Of the 39 species or species-groups associated with marsupial hosts, 30 are ultraspecific or generispecific in that they are primarily restricted to one genus of mammals or groups of closely-related mammals. In contrast, only 38% of 376 species or species-groups of rodent fleas are ultraspecific. A fourth trend is that, although ultraspecific fleas occur in all the mammalian orders that include members parasitized by fleas, many of the families in these mammalian orders, including the Caenolestidae, lack them. A final trend is that although ultraspecificity occurs in at least 10 of the 15 families of Siphonaptera, it is rare in large families like the Stephanocircidae. Traub (1985) suggested this was partially due to a lack of data but he did not doubt that fleas from large families tended to infest more than one species of host.

Based on examined material, there is no strong evidence indicating that any Plocopsylla species is ultraspecific. Collection data are inadequate for all species. General trends within the order indicate the six species parasitizing rodents are not ultraspecific, while they are contradictory regarding P. athena.

Generispecific fleas are those primarily restricted to one genus of mammals or groups of closely-related mammals. According to Traub (1985), within the order there are 183 species or
species-groups, or at least 102 genera, considered to be
generispecific, of which two-thirds (122 of 183) of them infest
rodents. Based on Table 1, P. chiris, P. fuegina and P. inti are
generispecific although the questionable identification of P.
chiris females may make the lectotype male ultraspecific. Again,
there is insufficient material to clarify host specificity.

Plocopsylla chiris, P. fuegina and P. inti could have broader
host specificities since all 19 siphonapteran groups that exhibit
intrafamilial host affinities, parasitize rodents.

Plocopsylla species that exhibit an intermediate degree of
specificity are described as intrafamilial or parasitizing hosts
within the same family. Based on Table 1, these species are P.
derleini, P. kilva, P. thor, P. ulysses and P. wolffsohni all
of which parasitize from two to six genera in the family Muridae.
Most of these species are inadequately represented by specimens;
although P. wolffsohni and P. viracocha are represented with
respectively five and six host genera and with both species each
collected from two South American countries. These two species
may well have intrafamilial host specificities.

Within the siphonapteran order, there are 19 groups with
intrafamilial host specificities, all parasitizing rodents (Traub
1985). This indicates that any or all six Plocopsylla species
may well have intrafamilial specificity.

Fleas with a broad host specificity are either extrafamilial
and infest several host families within the same order or are
extraordinal and regularly infest hosts assigned to more than one
mammalian order. Table I indicates *P. regi* is extrafamilial while *P. achilles*, *P. diana*, *P. hector*, *P. heros*, *P. phobos* and *P. phylissae* are extraordinal. It is worth noting that these species are not necessarily those with the most comprehensive collection data. *Plocopsylla diana*, associated with marsupial and rodent hosts, is known from a limited number of specimens and collection sites. These seven species could well be extrafamilial and extraordinal because Traub (1985) observed that 7 of 20 extrafamilial species within the order parasitize rodents and rodents are also the usual hosts for extraordinal fleas.

Our data concerning host specificity in *Plocopsylla* is further diluted by the fact that most collections have been developed coincidentally to small mammal surveys, and there is no assurance that unrelated hosts were kept separate until their ectoparasites could be collected. Until controlled ectoparasite surveys are conducted, it must be recognized that we know little or nothing of the true host/parasite affinities in this and most other South American genera of fleas.

Coevolution

The family *Stephanocircidae* is considered to be monophyletic (Holland 1964, Traub 1985). There are too many morphological similarities between the South American and Australian subfamilies for it to be likely that they are the result of convergent evolution. However, differences at the subfamily level in conjunction with certain primitive features may indicate
that the two subfamilies have been isolated for a considerable
period of time, perhaps since the Cretaceous period (Traub 1980).
The main subfamily difference is that the South American
subfamily Craneopsyllinae has a helmet suture that is vestigial
or that merges with the interantennal suture, while the
Australian subfamily Stephanocircinae has a well-developed helmet
suture.

There are several primitive morphological features
associated with the stephanocircids. One is the absence of
fusion, or a considerable reduction of it, between the relatively
large sensilial plate and the anal segments (Traub and Dunnet
1973). Wagner (1934) considered the sensilial plate of
Plocopsylla as primitive, because it "retained more original
characters" than those of other genera. Additional primitive
characters include the presence of multiple combs, the absence of
a ball and socket arrangement or a fulcrum for the movable
process of the clasper and a strong similarity between the female
ventral anal lobe and the dorsal anal lobe, along with the
absence of modified bristles on the ventral lobe (Jordan 1947,

Host associations are another indication of the primitive
nature of the Plocopsylla species. Based partially on the idea
that the most primitive fleas are associated with the most
primitive hosts (Jordan 1947, Traub 1968), it was suggested by
Traub (1980) that those fleas associated with Gondwanaland after
the breakup of Pangea, supposedly differentiated with
pre-stephanocircids and other groups occupying the South American region. Marsupials supposedly transported stephanocircids and other flea groups to Australia by crossing Antarctica. The rodent and insectivore hosts of *Plocopsylla* are described as "late immigrants" that entered South America from North America across the Panama land bridge, first established in the Pliocene-Pleistocene. *Plocopsylla* and other groups are thought to have transferred mainly to rodent hosts and coevolved with them (Traub 1985).

Traub (1985) suggested that if many fleas did coevolve with their hosts, they would exhibit divergent evolution with congeners that infest other kinds of mammals and exhibit convergent evolution with unrelated fleas that parasitize the same kinds of mammals. As evidence, he cited the genal and pronotal combs of fleas parasitizing shrews and those of fleas parasitizing moles. Species of *Ctenophthalmus*, *Paleopsylla*, *Coryopsylla* and *Nearctopsylla* (*F. Ctenophthalmidae*) that parasitize shrews (*Cryptotis*; Soricidae) have pronotal spines that tend to be blunt apically and a concave longitudinal axis, while the first 2 genal spines are rounded apically. In contrast, species from these four ctenophthalmid genera that are associated with moles and murids have pronotal spines that are straight and pointed apically, while their genal spines are more acute apically. Such a pattern also occurs in families such as the *Pygiopsyllidae* in which some species of fleas parasitize shrews and other species parasitize moles.
The discussion of possible coevolutionary trends between stephanocircids and their hosts focuses on the helmet modifications of the head as well as on the genal and pronotal combs. These combs are thought by several workers to be good examples of convergence because they tend to be modified in a characteristic manner and are therefore viewed as "adaptive" (Traub and Barrera 1966, Traub and Evans 1967).

There is a fairly diverse group of fleas that have what Traub (1980) described as "crowns of thorns". He uses this phrase in reference to any one of the following structures: marginal rows or a group of backward-directed spiniform bristles on the head, a subvertical genal comb that approximates the anterior cephalic margin, or, as in all stephanocircids, a comb of spines on a special helmet. He listed seven shared features among the taxonomically diverse fleas that have this modification, including a close association with hosts that have habits or habitats that present special hazards to their fleas, especially mammals which are both nocturnal and arboreal/scansorial. With such hosts, it is not surprising that fleas with "crowns of thorns" are often semi-sessile in behavior. Leptopsylla segnis has been observed to remain fixed in position for hours or days (Farhang-Azad et al. 1983).

Traub and Dunnet (1973) noted that among Australian helmeted fleas, there was a correlation between the helmet spines and the pelage of the host. This is reasonable, since the helmet with its ctenidium supposedly functions by separating close-set hairs.
of the host and hooking on to them. These workers observed that *Stephanocircus harrisoni*, which have stiletto-like helmet spines, were collected from bandicoots which have coarse, flattened hairs. In contrast, the helmet spines of murid-infesting *S. pectinipes* and *S. concinnus* are relatively broader and much more rounded apically. All the *Plocopsylla* species and other South American *stephanocircids* have helmet spines that are broad and even more rounded apically than *S. pectinipes* and *S. concinnus*. This suggests that *Plocopsylla*, as well as the other South American *stephanocircids*, have transferred to fine-furred rodents and coevolved with them. It should be noted that *S. dasyuri*, which stiletto-like helmet spines, has been collected from rodents as well as bandicoots and other marsupials. Possibly rodents are accidental hosts for this flea.

The incomplete collection date for *stephanocircids* suggest that broad, apically-blunt helmet spines usually are associated with rodents, while those usually associated with coarse-haired hosts such as bandicoots have stiletto-like helmet spines. The blunt helmet spines of *P. athena* indicates it is not ultraspecific on the marsupial *Ryncholestes raphanurus*. This view would be supported if the pelage of *R. raphanurus* consisted of coarse, flattened hairs similar to the bandicoot marsupials parasitized by *S. harrisoni*.

Although the shapes of helmet spines appear to relate to host pelage, the material examines indicates that a relatively large number of spines per helmet ctenidium does not seem to
relate to host pelage, behavior or habitat. Plocopsylla diana is unique in having 18 to 20 spines per helmet comb. Both P. diana and P. athena have been collected from the marsupial, R. raphanurus, while both P. diana and P. wolffsohni have been collected from the rodent Akodon longipilus. Yet both P. athena and P. wolffsohni, with 10 to 12 spines per helmet comb are among the Plocopsylla species having the fewest number of spines per helmet ctenidium.

There are several differences between the helmet ctenidia of South American and Australian stephanocircids. The ctenidium of South American stephanocircids usually does not extend to the dorsal and ventral margins of the helmet. In contrast, the Australian species have the outermost helmet spines actually projecting outward beyond the helmet margins. A second difference is that some of the South American stephanocircids, including some Plocopsylla, have helmet spines that are basally-notched whereas none of the Australian species have these notches. A third difference involves the shape of the helmet, which is quite variable among Plocopsylla. In P. angusticeps, the anterior margin is concave and the prectenidial helmet width is extremely narrow. In contrast, P. pallas has an anterior helmet margin that is convex and a prectenidial width that is at least twice the length of the longest helmet spine. The Australian species show less variation. Only the monotypic Coronapsylla has an anterior margin as strongly convex as it is in Plocopsylla. In Stephanocircus, the anterior margin of the
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helmet that is flattened or, at most, only slightly convex, and
the prectenidial helmet width is relatively narrow. How these
character differences relate to hosts is unknown.

According to Traub (1980), fleas including Plocopsylla, with
well-developed genal combs of at least four spines, are usually
associated with hosts having lifestyles that present hazards to
the parasites. Such an association coincides with that
previously mentioned between such hosts and fleas having "crowns
of thorns." It has been proposed that, among other functions, an
upright genal comb on the posterior margin of the gena may
function as a temporary holdfast while the flea is feeding.

In spite of similarities in genal comb function and vertical
arrangement, there is considerable variation of the genal comb
among the Plocopsylla material that I examined. Genal comb
spines range from four to seven in number with the four
ventralmost spines always blunt. Nine species have four genal
comb spines, although two or three is not uncommon in P.
phylisae. Nine species have five genal comb spines, typically
with the uppermost spine elongate and significantly tapered.
Plocopsylla achilles is the exception, having this spine short
and only slightly tapered. The three species with six spines in
the genal comb, all have the uppermost spine quite short and only
slightly tapered. Plocopsylla inti has seven spines in the genal
comb, with the uppermost spine relatively long but not tapered.
No correlation could be found between known hosts and either the
total number of genal spines or the variation in the uppermost
Plocopsylla phyllisae deserves special attention because of its unusual genal comb. Although described as having four spines in the genal comb, two or three was not uncommon among the specimens I examined. Even more unusual is that these spines are always extremely short to the extent that they are little longer than wide. Such a comb appears to be useless for any of the suggested functions associated with genal combs. And there appears to be no compensation for the short genal spines as the pronotal spines are also relatively short and the helmet spines are of a length characteristic for the genus. This shortness in both genal and pronotal spine lengths cannot be related to host pelage, behavior or habitat since P. phyllisae has been collected from the same rodent and marsupial species as other Plocopsylla species that have genal and pronotal spines of lengths more characteristic for the genus.

Pronotal comb modifications associated with shrew or rodent hosts have been reported by several workers (Smit 1958, Traub and Barrera 1966, Traub and Evans 1967). They noted that fleas in different genera and families that parasitized shrews typically have pronotal spines that are blunt and have the longitudinal axes curved. Traub (1980) also reported that the occasional species of Metastivalus and Pappapsylla (Pygiopsyllidae) that had transferred from murids back to bandicoot marsupials have stilleto-like pronotal spines. In contrast, closely-related fleas that parasitize murids have pronotal spines that are
straight and apically pointed. Similarly, the pronotal spines of _Plocopsylla_ species are slender, straight, and apically pointed including those of _P. hector_, _P. heros_ and _P. phobos_, which have been collected from _Cryptotis_. This supports the view that _Plocopsylla_ species have transferred from marsupials and have coevolved with rodents while insectivores may be accidental hosts.

Traub and Dunnet (1973) described a similar situation in murid-infesting _Stephanocircus_, in which the pronotal spines are straight, slender and much more apically pointed than the helmet and genal spines. They suggested the various combs of the resting flea affecting either different host hairs or the same hairs but at different heights. They cited Lyne and McMahon (1951), who stated individual mammal hairs show variation in diameter along their lengths. In addition, Traub and Dunnet noted that mammals have both protective guard hairs and undercoat, and the fact that in most helmeted fleas the genal, occipital and helmet regions are at least to some degree independently movable. Based on these three points, they suggested that combs have different functions. The helmet comb may function in hooking onto the undercoat, while the pronotal comb may separate or hook the more widely-separated and coarser guard hairs. Traub (1980) suggested the genal comb may aid in passage through the host hairs and serve as a temporary holdfast during feeding.

This explanation is difficult to accept. The length of the
hair shaft between the regions contacted by the helmet, genal and pronotal combs is insignificant. It is not reasonable to suggest that enough variation in diameter occurs within that short distance or that different types of hairs will be encountered in that short a difference in height to explain differences in spines among the three combs. In addition, the dorsalmost helmet spines should be of a height similar to that of the pronotal comb. Yet all the helmet comb spines are similar to the genal comb spines, especially the four ventralmost spines in the genal comb.

The following list summarizes host specificity in *Plocopsylla* and coevolution between *Plocopsylla* species and their hosts.

1. Host data indicate a significant separation between the host species parasitized by *Plocopsylla* species assigned to Species Group A and those assigned to Species Group B (Table 1). Of 52 host species, only *Oryzomys longicaudatus*, *Phyllotis darwini* and possibly *Akodon olivaceus* are known hosts for fleas representing both Species Groups A and B.

2. Traub (1980) generalized that there is usually only one species of flea with a "crown of thorns" parasitizing a given host in a given area, even if other congeners exist throughout the range of the host. This does not seem to apply to several *Plocopsylla* species as evidenced by the data presented in Table 2. For example, a number of *P. achillae*, *P. phobos* and *P. phylisae* specimens have identical collection data.
3. Although different Plocopsylla species can have identical collection data (Table 2), it should not be assumed that males and females collected from the same host animal or the same host species at the same site are necessarily the same species.

4. Because of points two and three, there is reasonable doubt as to the identity of the leptoallotype and other females identified as P. chiris. Points two and three also place doubt on the identification of the two female P. phobos mentioned here.

5. Host specificity based on data from Table 1 and generalizations within the order indicate that Plocopsylla species may range from generispecific to extraordinal. Reasons have already been cited as to why the seven species known only from one host species are probably not ultraspecific.

6. Coevolutionary trends indicate that Plocopsylla species with their helmet modification and well-developed vertical genal comb are closely associated with hosts that have habits or habitats that present special risks to the fleas, especially mammals which are both nocturnal and arboreal/scansorial.

7. The combination of apically blunt spines in the helmet and genal comb in conjunction with slender, straight, apically pointed pronotal spines matches that of Australian stephanocircids associated with rodent hosts. This supports the view that Plocopsylla species have transferred from marsupial hosts to the "late immigrant" rodents that crossed the Panama land bridge into South America. Marsupial
hosts and "late immigrant" insectivore hosts may be accidental hosts. This is supported by the reports of *P. hector*, *P. heros* and *P. phobos* having been collected from insectivores, marsupials and rodents, yet their ctenidial combs are similar to the remaining *Plocopsylla* species and other stephanocircid fleas associated with rodent hosts.
Table 1. Host species list with *Plocopsylla* species identified by their species subgroup

<table>
<thead>
<tr>
<th>Order Insectivora</th>
<th>Family Soricidae</th>
<th>Genus Cryptotis Pomel, 1848</th>
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<tr>
<td></td>
<td></td>
<td>Cryptotis equatoris</td>
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<td></td>
<td>- <em>P</em>. <em>hector</em> A-1</td>
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<td>- <em>P</em>. <em>heros</em> A-1</td>
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<td>Cryptotis thomasi</td>
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<td>- <em>P</em>. <em>heros</em> A-1</td>
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<td>- <em>P</em>. <em>phobos</em> A-1</td>
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<td></td>
<td></td>
<td>Cryptotis species</td>
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<td></td>
<td></td>
<td>- <em>P</em>. <em>phobos</em> A-1</td>
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<th>Order Marsupialia</th>
<th>Family Caenolestidae</th>
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<td>Caenolestes fuliginosus</td>
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<td>- <em>P</em>. <em>achilles</em> A-1</td>
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<td></td>
<td>- <em>P</em>. <em>hector</em> A-1</td>
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<td>- <em>P</em>. <em>heros</em> A-1</td>
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<td>- <em>P</em>. <em>phobos</em> A-1</td>
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<td>- <em>P</em>. <em>phyllisae</em> A-1</td>
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<td>Caenolestes obscurus</td>
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<td>- <em>P</em>. <em>phyllisae</em> A-1</td>
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<td>Caenolestes convexus</td>
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<td>Caenolestes species</td>
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<td>- <em>P</em>. <em>achilles</em> A-1</td>
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<td>- <em>P</em>. <em>phobos</em> A-1</td>
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<tr>
<td></td>
<td></td>
<td>Genus Ryncholestes Osgoodi, 1924</td>
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<td></td>
<td>Ryncholestes rapacetus</td>
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<td>- <em>P</em>. <em>athena</em> B-1</td>
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<td>- <em>P</em>. <em>diana</em> B-2</td>
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<td>Ctenomys magellanicus</td>
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<td>- <em>P</em>. <em>fuegina</em> B-1</td>
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<td>Ctenomys maulinus</td>
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<td></td>
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<td>- <em>P</em>. <em>reigi</em> B-1</td>
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<td>Ctenomys species</td>
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<td></td>
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<td>- <em>P</em>. <em>reigi</em> B-1</td>
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<tr>
<td>Family</td>
<td>Muridae</td>
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<tr>
<td>Genus</td>
<td>Akodon Meyen, 1933</td>
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<td></td>
<td>Akodon andinus</td>
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<td>- P. viracocha A-3</td>
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<td></td>
<td>Akodon bogotensis</td>
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<td>- P. ulysses A-1</td>
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<td></td>
<td>Akodon hirtus</td>
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<td></td>
<td>- P. wolffsohni B-1</td>
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<td></td>
<td>Akodon latabricola</td>
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<td>- P. phobos A-1</td>
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<td></td>
<td>Akodon longipilus</td>
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<td>- P. diana B-2</td>
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<td>- P. wolffsohni B-1</td>
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<td>Akodon mollis</td>
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<td>- P. thor A-1</td>
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<td>Thomasomys sp. (nr. caudivarius)</td>
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<td>- P. ulysse</td>
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Family Octodontidae
Genus Octodon Bennet, 1832
Octodon degus
- P. reigi B-1

The question mark (?) of P. angusticeps indicates that the identification of Akodon olivaceus is doubtful (Mahnert 1982). The question mark (?) of females of P. chiris and two females of P. phobos indicates that their own identifications are doubtful for reasons already mentioned. Males of P. chiris and P. phobos also have been collected from Phyllotis xanthopygus and Thomasomys sp., respectively.
Table 2. Nine instances in which two or three species of *Plocopsylla* appear to have identical collection data

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<th>Site</th>
<th>Date</th>
<th>Collector</th>
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<td>Ecuador</td>
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<tr>
<td>phobos</td>
<td>fuliginosus</td>
<td>G.2km W Papallacta</td>
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<td>Ecuador</td>
<td>27-IX-31</td>
<td>F. Spillmann</td>
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<tr>
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<td>fuliginosus</td>
<td>Pichincha</td>
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<td>Ryncholestes</td>
<td>Chile</td>
<td>1-05</td>
<td>M. Gallardo</td>
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<td>raphanurus</td>
<td>de Chiloe</td>
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<td>Cryptotis</td>
<td>Ecuador</td>
<td>28-IX-31</td>
<td>F. Spillmann</td>
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<tr>
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<td>equatorius</td>
<td>Pichincha</td>
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<td>hector</td>
<td>Akodon</td>
<td>Peru</td>
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<td>J. M. de la Barrera</td>
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<td>mollis</td>
<td>El Tambo</td>
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<td></td>
<td></td>
<td>3040m</td>
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<td>Ecuador</td>
<td>3-V-80</td>
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<tr>
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<td>paramorum</td>
<td>G.2km W Papallacta</td>
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<tr>
<td></td>
<td></td>
<td>3000m</td>
<td></td>
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<tr>
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<td>Thomasomys</td>
<td>Peru</td>
<td>(22 + 24)</td>
<td>J. M. de la Barrera</td>
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<td>Chile</td>
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<td>sahamae</td>
<td>Parinacota</td>
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Accessory bristle - See antepygidial bristle, bristle.

This is a second bristle, in the males of certain Plocopsylla species, that is located slightly dorsad or cephalad of the antepygidial bristle. It can be stout or hairlike but it is usually quite short compared to the antepygidial bristle. In the literature, if the accessory bristle was mentioned, it was given various names, including second antepygidial bristle. There is justification in using 'accessory bristle' as used by Beaucournu and Gallardo (1978) in describing P. fuegina and P. reigi. First, the bristle is of taxonomic value and should be included in the written description. Second, it would be misleading to refer to both the antepygidial and accessory bristles by the same name, since they differ significantly in structure. Third, 'accessory' is appropriate, since there can be an antepygidial bristle without an accessory bristle, but there is never an accessory bristle without an antepygidial bristle.

Aedeagal apodeme - This is one of three parts of the phallosome or intromittent organ (Peus 1956). Smit (1970) described it as the continuation into the body of the
palliolum (outer hood or paramere) of the aedeagus.
Also called penis plate (Hopkins and Rothschild 1956).

Aedeagal pouch - A sheathlike, frequently membranous pouch from which the aedeagus arises and which partially encloses the intromittent organ or phallosome (Hopkins and Rothschild 1971). Also called the phallocrypt (Smit 1970).

Antepygidial bristle - See accessory bristle, bristle. The bristle(s) that arise along the dorso-posterior margin of t. VIII and project posteriorly. They may arise from a pedestal. Females of Plocopsylia have one to three similar antepygidial bristles, while males have, at most, one such bristle. If males have a second bristle, it is slightly dorsad or cephalad of the antepygidial bristle, it is morphologically dissimilar to it, and it is an accessory bristle. Also called antesensilial bristle (Mahnert 1982).

Bristle - A setae of cellular origin that arises from a cup-like depression called an alveolus (Hopkins and Rothschild 1956). Most of the bristles in Plocopsylia are of a fairly large size and are referred to simply as bristles. Extremely slender, threadlike bristles associated with the distal arm of st. IX and the
subsensilial sclerite and, occasionally, the accessory bristle itself are described as 'hairlike' bristles. Other bristles are modified to the extent that they are quite thick and usually heavily sclerotized. These are referred to as 'spiniform' bristles and, in Plocopsylla, are always associated with the movable process and the distal arm of st. IX.

Bulga - See spermatheca.

Clasper (Figs. 87-88) - See tergite IX, fixed process and manubrium. As used here, clasper refers to the male structure formed by the fixed process, t. IX and manubrium. This contrasts with Hopkins and Rothschild (1956, 1971) who stated that the clasper should include the entire clasper organ and processes although they often apply the term to Pi or 'body of the clasper', excluding the more ventral processes and manubrium. Smit (1970) used the word 'paramere'. Figures 87 and 88 also define the sites on the fixed process where a dorsal lobe (DL) or mesal lobe (ML) may be found and where a mesal process (MP) is always located. As used here, a mesal 'lobe' of a clasper may be present, depending upon the species, but a mesal 'process' is always present.
Dorsal lobe of clasper (Figs. 87-88) - See clasper. This refers to a 'lobe' arising from the dorsal margin of the fixed process, preceding the apical fringe. Examples of 'dorsal lobes' are on the claspers of *P. enderleini* and *P. inti*. Hopkins and Rothschild (1956) described this as a 'fingerlike process' on the clasper of *P. enderleini*, this conflicts with the definitions of clasper 'lobe' and clasper 'process' as used here.

False comb (Figs. 89-91) - A row of spiniform bristles in contrast to a true comb which consists of a row of spines that are usually stout and close set (Hopkins and Rothschild 1956). In *Plocopsylla*, a false comb may be present along the posterior margin of the hind tibia. If it is a complete false comb, as in *P. hector* and *P. killya*, it extends around the apex of the hind tibia. If it is an incomplete false comb, as in *P. scotinomi* and *P. ulysses*, it does not extend around the apex.

Fixed process of clasper (Figs. 87-88) - See clasper. This is the posterior one-half of the clasper and includes an apical fringe of long bristles, a mesal process and possibly a dorsal or mesal 'lobe.' Hopkins and Rothschild (1956) state that the fixed process of the ceratophyloid clasper is homologous with the process that in older literature on the pulicoid, was called the 'large flap',...
and is now usually called P1. It also has been called the 'immovable process' in the original descriptions of P. inti, P. scotinomi and P. thor (Johnson 1957, Tipton and Mendez 1968) as well as 'processus basimeris' (Smit 1970).

Genal spine - Refers to the uppermost spine in genal comb when there are more than four spines in that comb. It would be the fifth, sixth or seventh spine from the ventral margin, depending on whether there were five, six or seven spines in the entire genal comb. It always arises on the genal lobe.

Hairlike bristle - See bristle.

Hilla - See spermatheca.

Manubrium (Figs. 87-88) - See clasper. This is the cephalo-ventral portion of the clasper ventral to the portion designated as t. IX. It is considered to be a 'ventral apodeme of t. IX' (Hopkins and Rothschild 1958) or an 'apodeme of the body of the clasper which has joined t. IX' (Smit 1970).

Marginal spinelets - These are extremely small, triangular spines positioned along the posterior margins of the
anterior tergites. They are viewed as vestigial or incipient combs of the abdominal tergites although spinelets can be located elsewhere in other groups of fleas (Hopkins and Rothschild 1956). Counting the number of spinelets per tergite is illustrated in the following example: I 3-4/3-4, II 2-4/4-3, III 1-3/1-2, IV 0/0-2. Tergite 1 has three or four spinelets on the near side and three or four spinelets on the far side, tergite 2 has two to four spinelets on the near side and two to three spinelets on the far side, and so on.

Mesal lobe of clasper (Figs. 67-88) - See clasper. This refers to any lobe that may arise from the mesal surface of the fixed process. It may project slightly above the dorsal margin of the fixed process, preceding the apical fringe, as in P. fuegina, in which case it may be confused with a dorsal lobe; or it may be overlapped by the dorso-apical bristles of the fringe, as in P. diana and P. reigi; or it may be situated more ventrally, with, at most, a hairlike apical bristle extending above the dorsal margin of the fixed process, as in P. angusticeps and P. lewisi. It should not be labeled a 'fingerlike process' as in Mahnert's (1982) description of P. angusticeps since that conflicts with the definitions of clasper 'lobe' and clasper 'process' as used here.
Mesal process of clasper (Figs. 87-88) - See clasper. This species-specific structure is always present on the mesal surface of the fixed process, and therefore does not match the definition of a clasper 'lobe' as used here. It usually consists of a heavily-sclerotized dorsal region that is visible in a whole mount and usually a membranous ventral lobe that is visible in dissected material. Traub (personal communication, 1987) noted this structure is on the mesal surface and should not be called a 'lateral projection' (Hopkins and Rothschild 1956). The mesal process in the Craneopsyllinae acts as a locking device for the movable process (Hopkins and Rothschild 1956). They do not view it as homologous with any other process or lobe present in the other families included in volume II of their catalogue. Also called an 'accessory process' (Johnson 1957) but as used here, 'accessory' refers to a structure that is present only in certain species rather than present in all of them.

Movable process - In the literature, this structure was also called 'F' in reference to the name 'finger' (Rothschild 1909), 'exopodite F' (Jordan 1931b), 'digitoid process' of the Ceratophyloidea (Hopkins and Rothschild 1956) and 'telomere' (Beaucournu, Gallardo and Launay, 1988). There is disagreement as
to whether the movable process is homologous with 
P2 or P3 of the Pulicoidea (Hopkins and Rothschild 
1956).

Ninth sternite (of male) (Figs. 87-88). - As used here, 
this structure consists of both 'proximal' or 
cephalic and 'distal' or caudal arms as labeled by 
Hopkins and Rothschild (1956). Other names are 
'pars posterior' and 'pars anterior', respectively, 
(Smit 1970), as well as 'dorsal' and 'ventral', 
respectively (Holland 1969).

Ninth tergite (of male) (Figs. 87-88) - See clasper. 
This refers to the antero-dorsal extension of the 
clasper that is located above the manubrium. Other 
names include 'tergal apodeme', 'ninth apodeme' or 
'tergal apodeme of the ninth tergite' (Peus 1956, 
Johnson 1957, Smit 1970). There is disagreement 
involving the extent of this structure, which is 
discussed by Hopkins and Rothschild (1971).

Prectenidial width of helmet (Figs. 92-93) - The 
greatest horizontal distance between the anterior 
margin of the helmet and the bases of the helmet 
spines. This value is always contrasted with the 
horizontal length of the longest helmet spine.
Plocopsylla athena (Fig. 93) has a relatively narrow prectenidial width and P. viracocha (Fig. 92) has a relatively broad prectenidial width.

Preoral tuber – an internal incrassation of the frons located anteriorly to the base of the mouthparts. Usually campanulate in the Plocopsylla species. Depending on the group of fleas, there may be two or more additional incrassations. For example, stephanocircid fleas also have a subdorsal or occipital incrassation (Hopkins and Rothschild 1956), but homologies between the internal incrassations of different groups have not been studied. Both the preoral and occipial incrassations are included in Figs. 92 and 93.

Pseudosetae – Slender, unsclerotized, bristle-like spines arising from under the collar of the mesonotum in Plocopsylla species. In other groups of fleas they may arise from other locations such as from under the metanotal collar. Hopkins and Rothschild (1956) advocate using this term since it is in general use compared to a more accurate term such as ‘false bristles’.

Sclerotized inner tube – The posterior continuation
of the endophallus. Many of its bizarre modifications serve to anchor it in position in the female vagina (Goncharov 1964 cited in Hopkins and Rothschild 1971). Also called 'ejaculatory duct' (Hopkins and Rothschild 1958).

Spermatheca - This is the female structure in which spermatozoa are stored. It is divided into the bulga and the hilla. The bulga is the enlarged portion between the hilla and the spermathecal duct. Other names are 'head', 'body' and 'reservoir'. The hilla is the elongate tube that may penetrate into the bulga. Other names include 'tail' and 'appendix' (Peus 1958). For comparative purposes, the lengths of the hilla and bulga are oriented with the long axis of each structure, as in Hopkins and Rothschild (1958).

Spiniform bristle - See bristle.

Submarginal bristles of gena - Minute bristles located slightly behind the anterior margin of the gena. Frequently overlapped by ventralmost helmet spines.

Subsensillal sclerite - The proximal ventral sclerite of the proctiger or anal segment (Johnson 1957).
Generalized Outlines of Male Structures
Figs. 87-88. Generalized outlines of male structures.

Ninth sternites, movable processes (shaded) and claspers as they appear in males assigned to Species Group A (Fig. 87) and those assigned to Species Group B (Fig. 88). Labelled structures include: (da) - distal (posterior) arm of st. IX; (dl) - location of dorsal lobe of clasper, if present; (fp) - fixed process of clasper; (mb) - manubrium of clasper; (msl) - two possible locations of mesal lobe of clasper, if present; (msp) - mesal process of clasper; (mvp) - movable process; (pa) - proximal (anterior) arm of st. IX; and (t. IX) - tergite IX of clasper.
Bristle Arrangements
Figures 89-91. Bristle arrangements. Possible arrangements of bristles along the posterior margin of the hind tibia. 89. Incomplete false comb as in $P._{ulysses}$ (composite of two males). 90. Complete false comb as in $P._{Kilva}$ (holotype male). 91. Absence of false comb as in $P._{enderleini}$ (male). Line scale for Figs. 89-91.
Examples of *Plocopsylla* Heads
Figures 92-93. Examples of Plocopsylla heads. 92. The relatively wide prectenidial helmet width of *P. viracocha*. 93. The relatively narrow prectenidial helmet width of *P. athena*. Line scale for Figs. 92 and 93.
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