

# FLEAS (SIPHONAPTERA) OF THE SIAN KA'AN BIOSPHERE RESERVE, QUINTANA ROO, MEXICO

Escrito Por  
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Capitulo No. XX del libro Diversidad Biológica en la Reserva de la Biosfera de Sian Ka'an Quintana Roo, México

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## FLEAS (SIPHONAPTERA) OF THE SIAN BIOSPHERE RESERVE, QUINTANA ROO, MEXICO

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The flea fauna of the Sian Ka'an Biosphere Reserve, as well as that of the whole State of Quintana Roo, is virtually unknown. In light of the scant information that we have gathered, it can be observed that the species that are known to be present in this territory are associated with various mammals that belong to the Neotropics. In fact, they reflect an authentic affinity with southern elements, particularly of the Middle American region. Within this territoriality of their hosts, they are distributed among biotopes that exist from sea level to areas of low elevations.

The knowledge and understanding of the ecology of these ectoparasites is important since their hosts are part of the natural heritage contained in the Sian Ka'an Biosphere Reserve. Furthermore, fleas play an important role in human and veterinary medicine because many of them are actual or potential vectors of plague, tularemia, murine typhus and other diseases that affect human beings and animals.

This communication presents information on the species of fleas that are known to occur in Quintana Roo, and those that, perhaps, may be found in that area. The scant material that we have been able to examine was obtained through the efforts of Dr. Daniel Navarro and his colleagues at the Centro de Investigaciones de Quintana Roo. The paper on Mexican Siphonaptera by Morales and Llorente (1986), was a

valuable aid for the evaluation of possible flea taxa that might exist in the area of the Reserve. The paper by Barrera (1962) has also been very helpful in this analysis. The host factors, as well as climatic conditions prevailing in the area, and physiographic parameters, have been taken into consideration in this regard.

This preliminary account lists the taxa known to occur in Quintana Roo, as well as other that, perhaps, exist in this territory. In addition, illustrations pertaining to selected species, as well as a host-parasite list, are included. It is the hope that this paper will stimulate other investigators to conduct further research to enhance our knowledge of the flea fauna of the Sian Ka'an Biosphere Reserve. A general survey of the species of fleas harbored by mammals of the area is needed. For instance, no records of bat fleas from Yucatan are registered in the literature; however, we presume that, possibly, various species are associated with the rich bat fauna of the Peninsula. At the same time, collecting of flea specimens that might be present on certain birds and in their nests should be considered. In the case of birds, as well as with mammals such as rodents, nesting material should also be investigated for fleas. Bat guano may be a good source from which to rear interesting taxa of fleas and other ectoparasites.

The following account is in accordance with the classification presented by Johnson (1957).

## Phylum ARTHROPODA

### Class Insecta

### Orden Siphonaptera

### Superfamily Rhopalopsylloidea

### Family Rhopalopsyllidae

### Subfamily Rhopalopsyllinae

### Tribe Rhopalopsyllini

*Polygenis gwyni* (C. Fox, 1914)

(Fig. 1)

*Rhopalopsyllus gwyni* C. Fox, 1914, Hyg. Lab. Bul. 97: 5, 10 - 11.

This species is primarily associated with *Sigmodon hispidus*. We have seen 12 males and 25 females from this host, as well as one male taken from *Agouti paca*, all of them collected by D. Navarro at Quintana Roo in 1986.

*Polygenis odiosus* Smit, 1958

(Fig. 2)

*Polygenis odiosus* Smit, 1958. Senck. biol. 39(3/4), 201 - 208.

*P. odiosus* seems to be a specific parasite of *Ototylomys phyllotis*; however, it also infests *Peromyscus* species and, perhaps, other cricetids. The first report of this species from Mexico is that of Smit (1987), who mentions 1 male, 1 female, ex *Peromyscus yucatanicus*, taken near Merida, Yucatan, on 21 March 1971.

*Rhopalopsyllus australis australis* (Rothschild, 1904)

*Pulex australis* Rothschild, 1904, Novit. Zool., 11: 63, Pl. 9, fig. 29; Pl. 10, figs. 34, 36 (partim).

Published Mexican records of this taxon are from *Dicotyles labiatus* [= *Tayassu pecari*], *Didelphis marsupialis*, *Tamandua tetradactyla* [= *T. mexicana*] and a skunk.

*Rhopalopsyllus cacicus saevus*

Jordan and Rothschild, 1923

(Fig. 3)

*Rhopalopsyllus cacicus*, Jordan and Rothschild, 1923, Ectop., 1: 323, 350 (partim).

Hubbard (1958) reported this taxon from human from Comitán, Chiapas. Elsewhere it has been recorded from *Dasyus novemcinctus*, *Didelphis marsupialis*, *Proechimys semispinosus*, *Agouti paca*, *Dasyprocta punctata* and other hosts.

*Rhopalopsyllus lugubris cryptoctenes*

(Enderlein, 1912)

(Fig. 4)

*Rothschildella cryptoctenes*, Enderlein, 1912, Zool. Anz., 40: 72, figs. 1 - 5, 7. Cunha, 1914, Mem. Inst. Osw. Cruz, 6:130, text fig. 1.

This flea is a typical parasite of the *paca*, *Agouti paca*, but it is sometimes found on other mammals. It does not appear to have been recorded previously from Mexico. We have examined 6 males, 9 females from *Agouti paca* collected by D. Navarro at Puerto Morelos, Quintana Roo, on 6 March 1986.

## Superfamily Pulicoidea

### Family Pulicidae

### Subfamily Pulicinae

### Tribe Xenopsyllini

*Xenopsylla cheopis* (Rothschild, 1903)

(Fig. 5)

*Pulex cheopis* Rothschild, 1903, Ent. Month. Mag., (2), 14:85, pl. 1 (Figs. 3, 9), 2 (Figs. 12, 19).

This cosmopolitan species is widespread throughout the world and is primarily found associated with domestic rats. It is considered to be the most efficient vector of plague and murine typhus.

#### Tribe Archaeopsyllini

*Ctenocephalides canis* (Curtis, 1826)

*Pulex canis* Curtis, 1826, Brit. Ent., 3:114, Figs. A-E, 8.

This species is popularly known as the dog flea and is found in most parts of the world. The domestic dog, *Canis familiaris*, seems to be its preferred host in Mexico.

*Ctenocephalides felis* (Bouché, 1835)

(Fig. 6)

*Pulex felis* Bouché, 1835, Nova Acta Physico-Medica Acad. Caes. Leop. Carol. 17(1): 505.

Although it is identified as the cat flea, and it seems to prefer *Felis catus* as its main host, this species has been found on a variety of hosts. In Mexico, it has been reported from *Didelphis marsupialis*, *Sylvilagus floridanus*, *Microtus mexicanus*, *Bassariscus astutus*, *Canis familiaris*, *Felis catus* and *Lynx rufus*. Dr. Nixon Wilson (1988) has communicated to me the following records from Merida, Yucatan: 9 males, 6 females, *Canis familiaris*, 28.X.1979, and 3 males, 6

females, *Felis catus*, same date, J. B. Bowles.

#### Tribe Pulicini

*Pulex irritans* Linnaeus, 1758

(Fig. 7)

*Pulex irritans* Linnaeus, 1758, Syst. Nat., 10th ed., 1: 614.

The so called human flea, is distributed in warm and temperate areas of the world. It is sometimes found on man; however, it utilizes a range of hosts, including carnivores such as the domestic dog, *Canis familiaris*, and the coyote, *Canis latrans*.

*Pulex simulans* Baker, 1895

*Pulex simulans* Baker, 1895, Can. Ent., 27: 65, 67.

Mexican records of this flea are from man, *Didelphis marsupialis*, *D. virginiana*, *Citellus variegatus*, *C. macrourus*, *Cynomys mexicanus*, *Microtus mexicanus subsimus*, and *Canis latrans*, among other mammals.

*Pulex porcinus* Jordan & Rothschild, 1923

(Fig. 8)

*Pulex porcinus* Jordan & Rothschild, 1923, Ectoparasites I, 312, figs. 315 - 317.

The distribution of *Pulex porcinus* is limited to Mexico and the United States of America. In Mexico it has been taken from *Felis hernandezii*, *Dasylops novemcinctus fenestratus*, *Dicotyles tajacu*, and *Odocoileus virginianus mexicanus*.

*Pulex sinoculus* Traub, 1950

(Fig. 9)

*Pulex sinoculus* Traub, 1950, Fieldiana, Zool. Mem. 1, 85, pl. 49, figs. 1 - 3, pl. 50.

This species is known from Guatemala and Mexico, and perhaps occurs in the Sian Ka'an Biosphere Reserve. It has been found associated with *Orthogeomys grandis*, *Sciurus g. griseoflavus* and *Canis familiaris*. However, the first two hosts have not been recorded from the Yucatan Peninsula.

*Pulex alvarezii* Barrera, 1955

*Pulex (Juxtapulex) alvarezii* Barrera, 1955, An. Esc. Nac. Cienc. Biol., VIII (3 - 4): 225 - 228, figs. 3, 7, 8, 10.

*Pulex alvarezii* is known from a large series of specimens from Chiapas taken on *Tapirella bairdii* [= *Tapirus bairdii*] by M. SAlvarez del Toro on December 1954.

### Tribe Echidnophagini

*Echidnophaga gallinacea* Wagner, 1875

(Fig. 10)

*Sarcopsyllus gallinaceus* Westwood, 1875, Ent. Month. Mag., 11: 246.

This species, known as the stick tight flea or tropical hen flea, is a pest of domestic fowls in many parts of the world. The records from Mexico are from the domestic fowl and various mammals.

### Subfamily Tunginae

*Tunga penetrans* (Linnaeus)

(Fig. 11)

*Pulex penetrans* Linnaeus, 1758, Syst. Nat., 10th ed.:614.

The nigua or chigoe is found in warm areas of America and Africa. The female borrows into the skin, usually the feet, of domestic pigs, cats, sheep, cattle, horses and man.

### Host-Parasite List

Class Mammalia

Order Marsupialia

Family Didelphidae

Subfamily Didelphinae

*Didelphis virginiana*

-*Rhopalopsyllus a. australis*

-*Ctenocephalides felis*

-*Pulex simulans*

-*Echidnophaga gallinacea*

*Didelphis* sp.

-*Adoratopsylla intermedia vidua*

Order Primates

Family Hominidae

*Homo sapiens*

-*Rhopalopsyllus casicus*

*saevus*

-*Pulex irritans*

Order Xenarthra

Family Myrmecophagidae

Subfamily Myrmecophaginae

*Tamandua mexicana*

-*Rhopalopsyllus a. australis*

Family Dasypodidae

Subfamily Dasypodinae

*Dasypus novemcinctus mexicanus*

-*Pulex porcinus*

Order Lagomorpha

Family Leporidae

Subfamily Leporinae

*Sylvilagus floridanus*

-*Ctenocephalides felis*

-*Echidnophaga gallinacea*

-*Euhoplopsyllus glacialis*

Order Rodentia

Family Cricetidae  
 Subfamily Cricetinae  
*Oryzomys phyllotis*  
 -*Polygenis odiosus*  
*Sigmodon hispidus*  
 -*Polygenis gwyni*  
 Family Muridae  
 Subfamily Murinae  
*Mus musculus*  
 -*Xenopsylla cheopis*  
 -*Leptopsylla segnis*  
*Rattus norvegicus*  
 -*Xenopsylla cheopis*  
 -*Leptopsylla segnis*  
*Rattus rattus*  
 -*Leptopsylla segnis*  
*Rattus* sp.  
 -*Tunga penetrans*  
 Order Carnivora  
 Family Canidae  
 Subfamily Caninae  
*Canis familiaris*  
 -*Ctenocephalides canis*  
 -*Ctenocephalides felis*  
 -*Echidnophaga gallinacea*  
 -*Pulex irritans*  
 -*Pulex sinoculus*  
*Canis latrans*  
 -*Pulex irritans*  
 -*Pulex simulans*  
 Family Procyonidae  
 Subfamily Procyoninae  
*Bassariscus astutus*  
 -*Ctenocephalides felis*  
 -*Pulex simulans*  
 -*Pulex irritans*  
 -*Echidnophaga gallinacea*  
*Nasua nasua*  
 -*Ctenocephalides felis*  
*Procyon lotor*  
 -*Rhopalopsyllus a. australis*  
 Family Mustelidae

Subfamily Mustelinae  
*Mustela frenata*  
 -*Echidnophaga gallinacea*  
 Order Perissodactyla  
 Family Tapiridae  
*Tapirus bairdii*  
 -*Pulex alvarezii*  
 Order Artiodactyla  
 Family Tayassuidae  
 Subfamily Tayassuinae  
*Tayassu tajacu*  
 -*Pulex porcinus*  
*Tayassu pecari*  
 -*Rhopalopsyllus a. australis*  
 Family Cervidae  
 Subfamily Odocoileinae  
*Odocoileus virginianus*  
 -*Pulex porcinus*

ACKNOWLEDGEMENTS.- I am indebted to Daniel Navarro L. for his kind invitation to prepare this paper and for providing literature and a collection of fleas he made at Quintana Roo. My thanks are also extended to Drs. Nixon Wilson and Robert E. Lewis for valuable information and making available for study specimens of *Pulex porcinus* and *P. sinoculus*, respectively. Dr. Lewis also supplied literature indispensable in identifying Mexican *Polygenis*.

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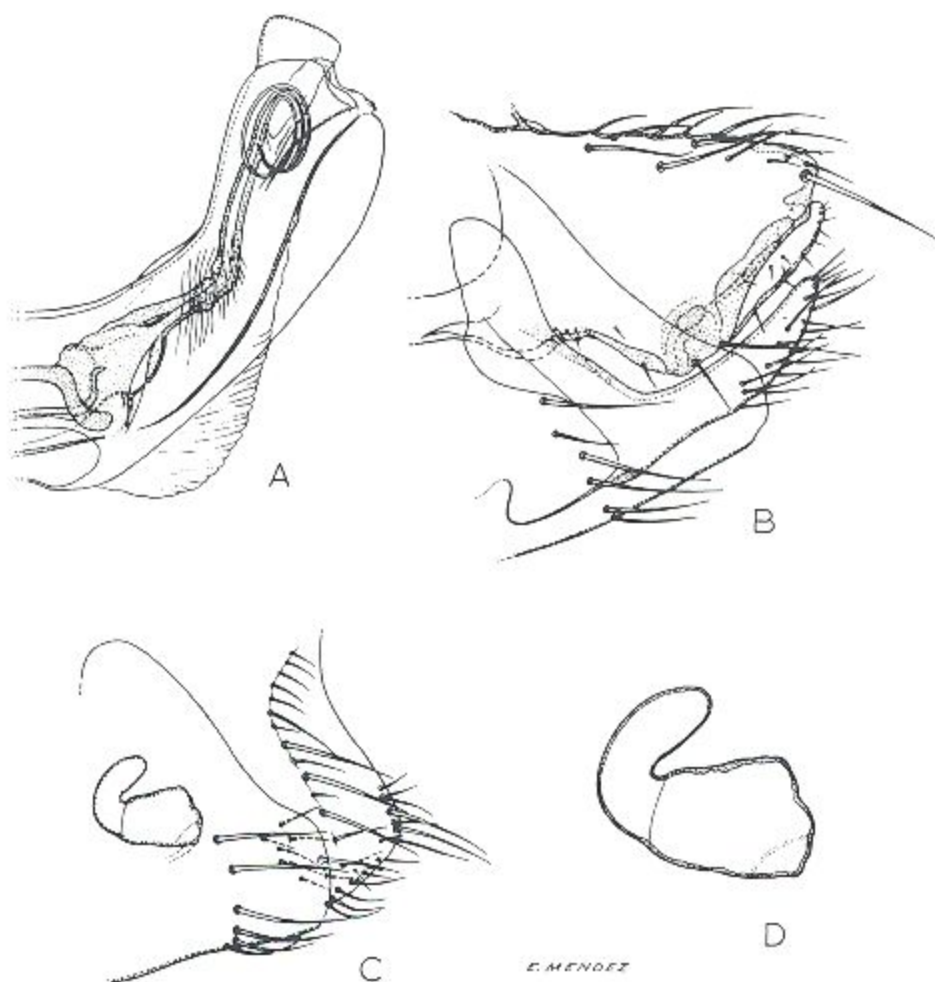
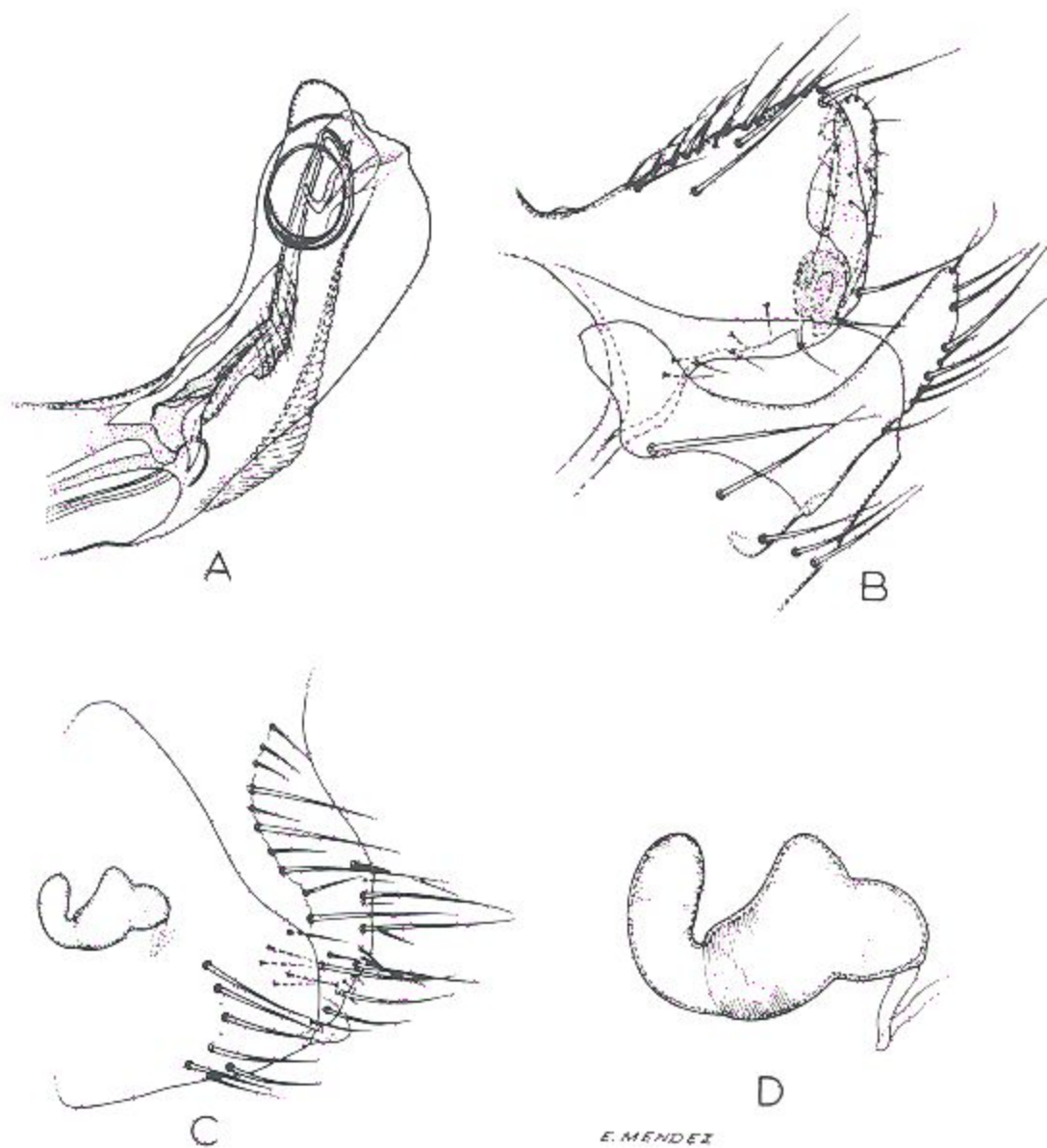


Fig. 1. *Polygenis gwyni*

- A. Aedeagus
- B. Sternum VIII, segment IX and paramere of male.
- C. Sternum VII, tergum VIII and spermatheca of female.
- D. Female spermatheca.



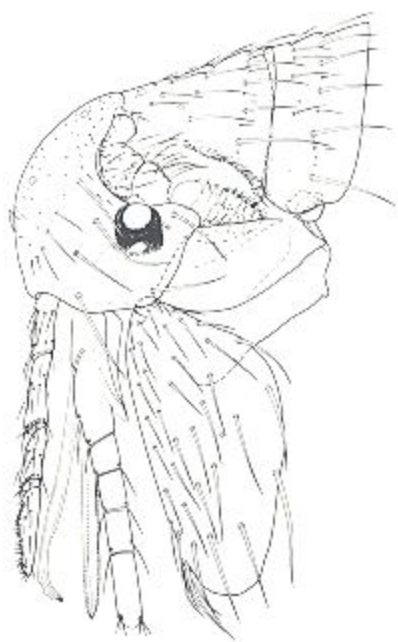


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FIGURA 2

Fig. 2. *Polygenis odiosus*

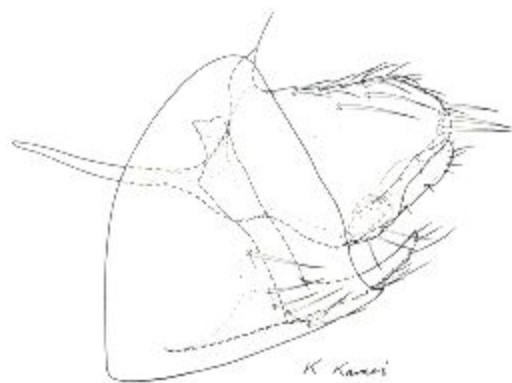
- A. Aedeagus
- B. Sternum VIII, segment IX and paramere of male.
- C. Sternum VII, tergum VIII and spermatheca of female.
- D. Female spermatheca.



A



C



B

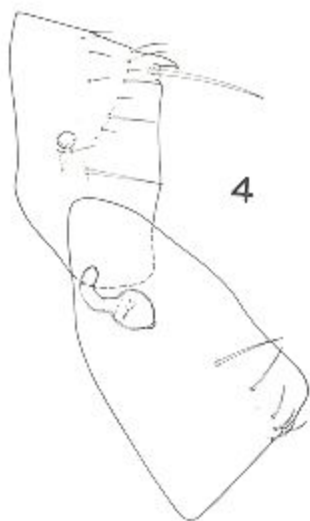
Fig. 3. *Rhopalopsyllus cacicus saevus* Jordan and Rothschild

- A. Head, prothorax and procoxa of male.
- B. Part of male genitalia.
- C. Spermatheca and 7th abdominal segment

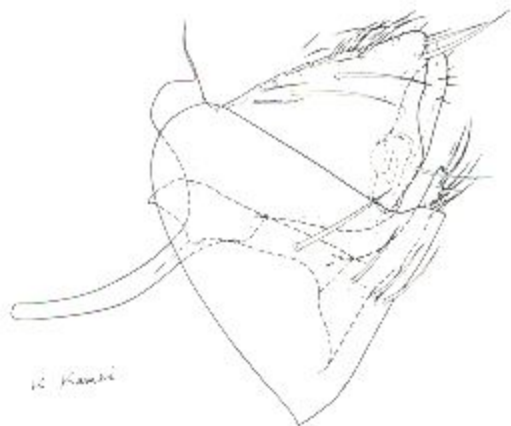
from "The Fleas (Siphonaptera) of Panama" by Tipton and Mendez, in "Ectoparasites of Panama", Field Museum of Natural History, Chicago (1966).



A



C

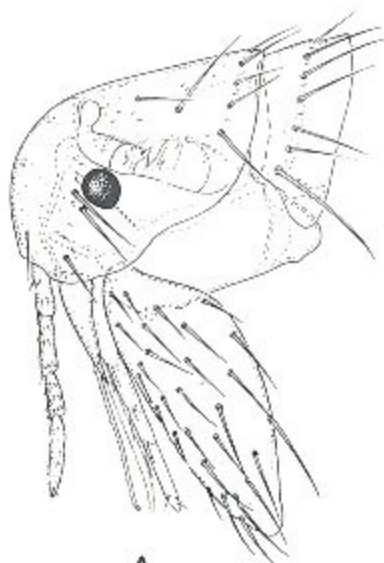


B

Fig. 4. *Rhopalopsyllus lugubris cryptoctenes* (Enderlein)

- A. Head, prothorax and procoxa of male
- B. Part of male genitalia
- C. Spermatheca and 7th abdominal segment of female.

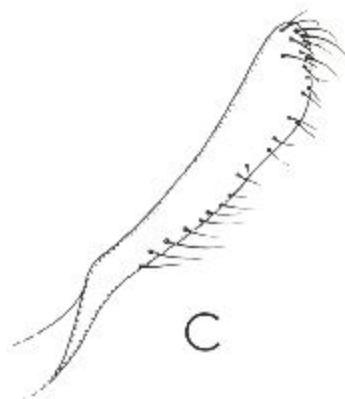
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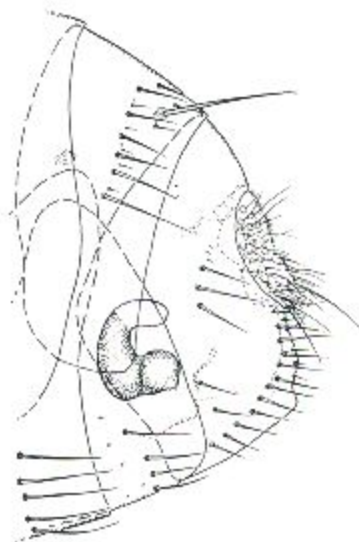
A



B



C



D

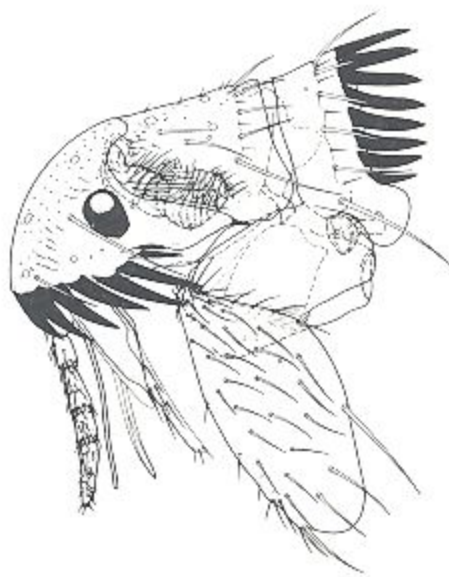


E

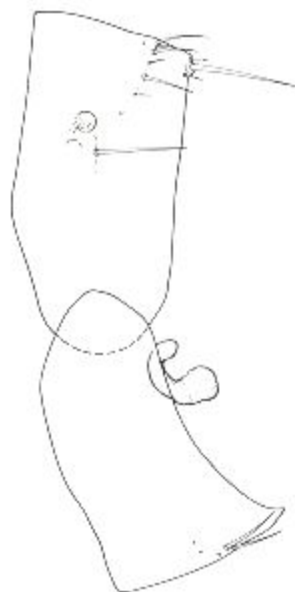
Fig. 5. *Xenopsylla cheopis* (Rothschild)

- A. Head, prothorax and procoxa of male.
- B. Processes of male clasper.
- C. Distal arm of male 9th sternum.
- D. Modified abdominal segments of female.
- E. Spermatheca.

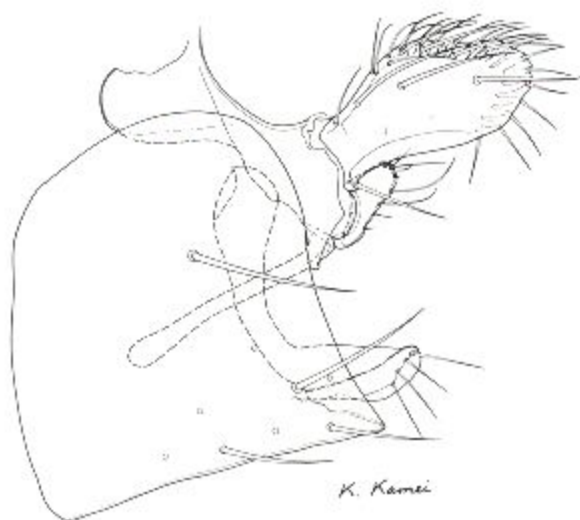




A



C



B

Fig. 6. *Ctenocephalides felis* (Bouché)

- A. Head, prothorax and procoxa of male.
- B. Part of male genitalia.
- C. Spermatheca and 7th abdominal segment of female.

from "The fleas (Siphonaptera) of Panama" by Tipton and Mendez, in "Ectoparasites of Panama", Field Museum of Natural History, Chicago (1966).

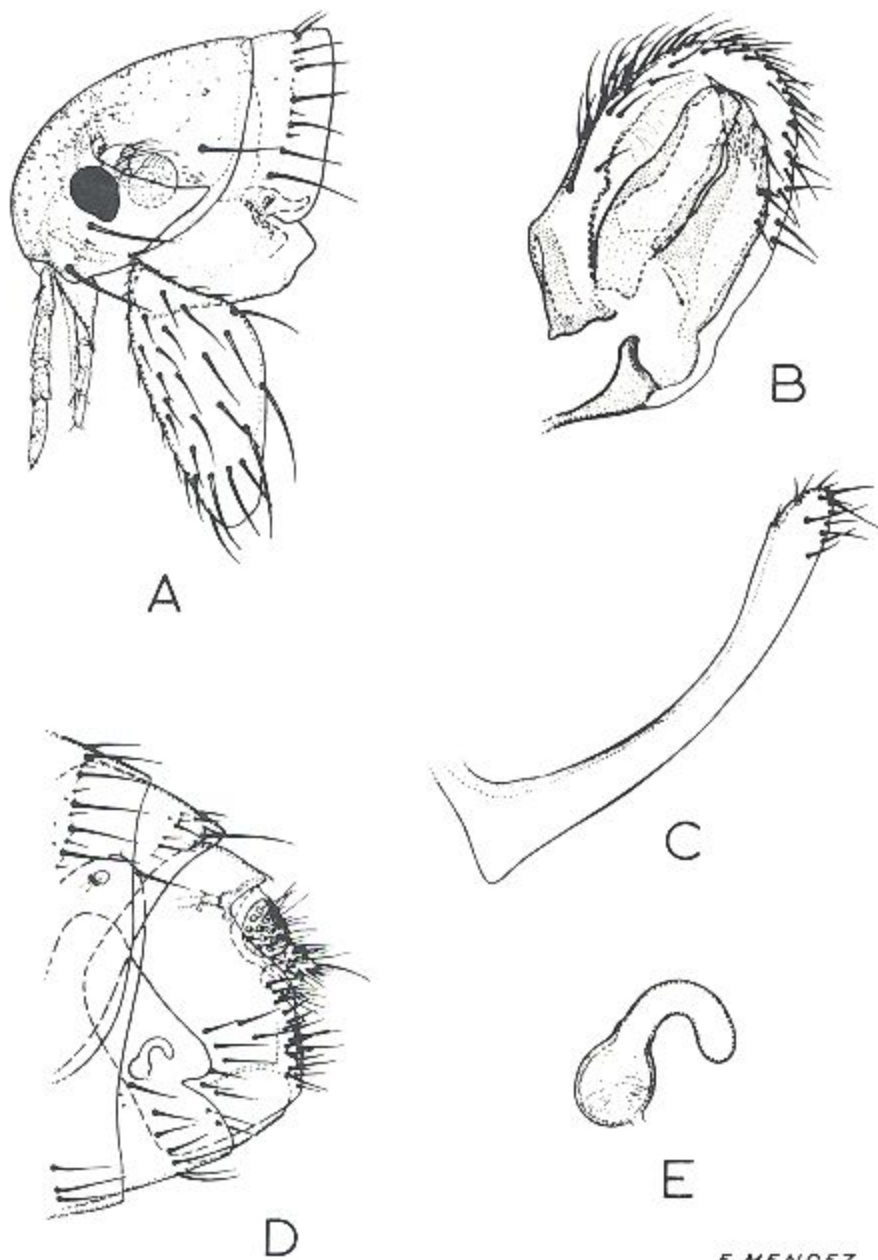
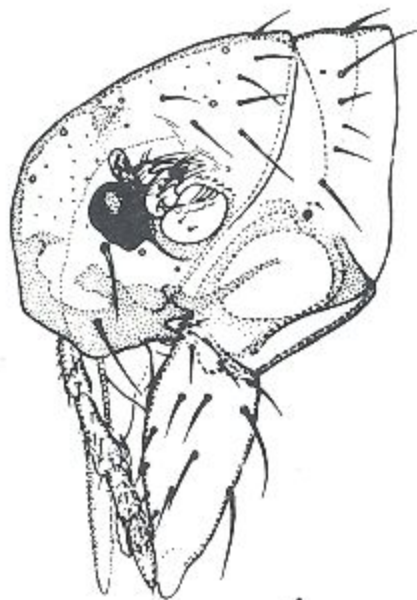
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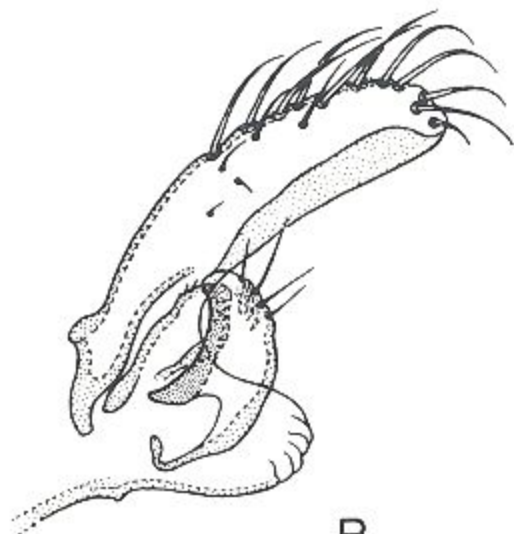
FIGURA 7

Fig. 7. *Pulex irritans* Linnaeus

- A. Head, prothorax and procoxa of male.
- B. Processes of clasper.
- C. Distal arm of male 9th sternum.
- D. Modified abdominal segments of female.
- E. Spermatheca.



A



B



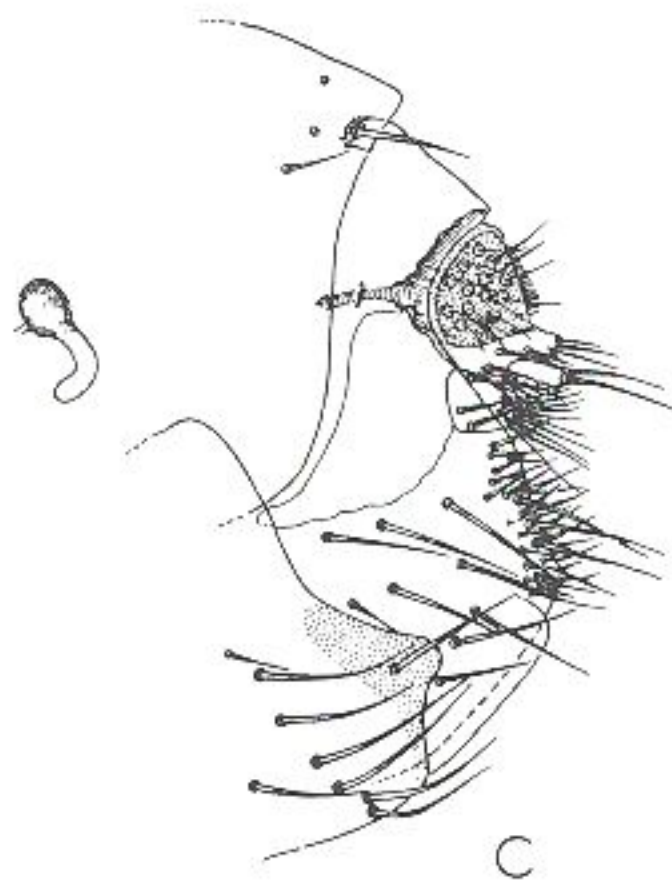
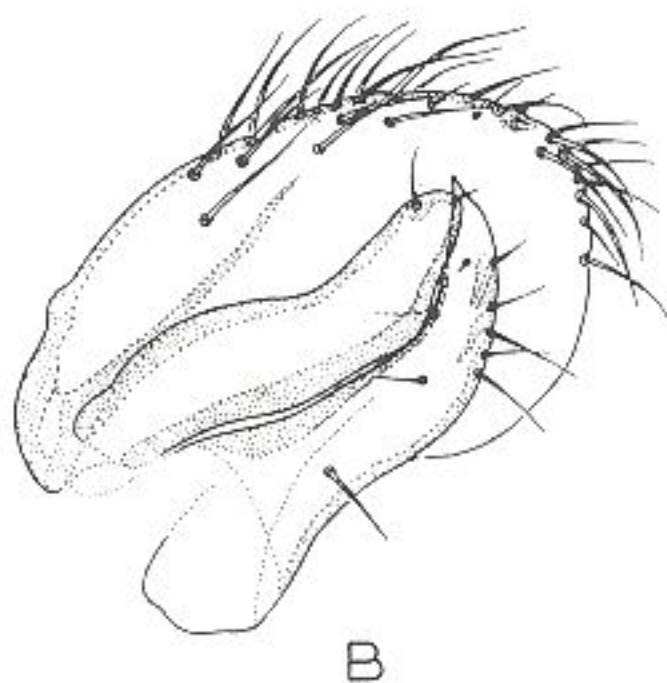
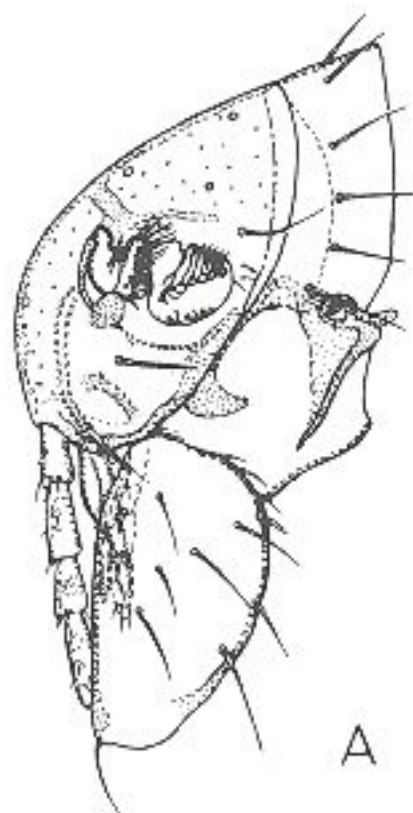
C



D

Fig. 8. *Pulex porcinus* Jordan and Rothschild

- A. Head, prothorax and procoxa of male.
- B. Processes of clasper.
- C. Apex of abdomen and spermatheca of female.
- D. Spermatheca.

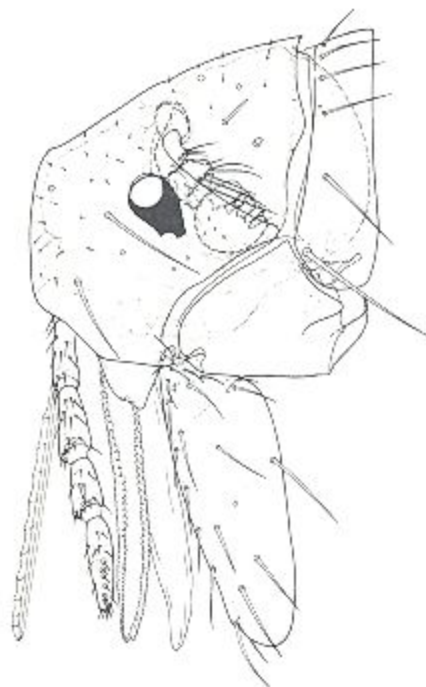


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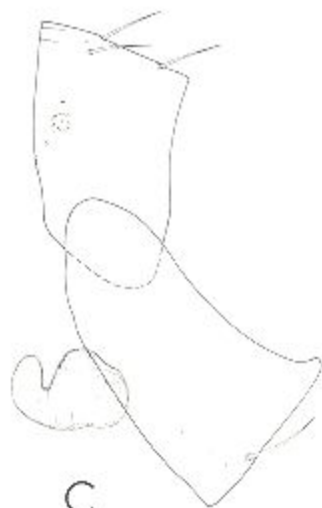
Fig. 9. *Pulex sinoculus* Traub

- A. Head, prothorax and procoxa of male.
- B. Processes of clasper.
- C. Apex of abdomen and spermatheca of female.
- D. Spermatheca.

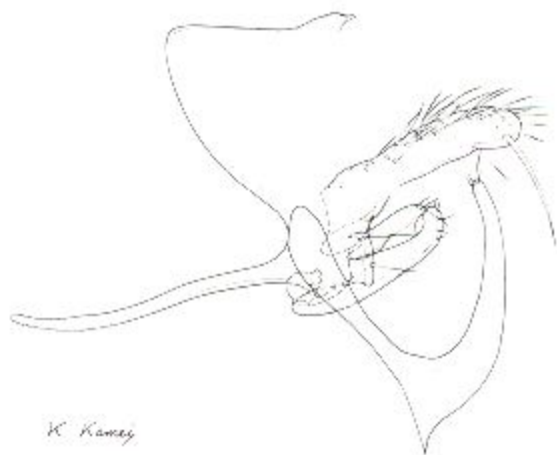




A



C



B

Fig. 10. *Echidnophaga gallinacea* (Westwood)

- A. Head, prothorax and procoxa of male.
- B. Part of male genitalia.
- C. Spermatheca and 7th abdominal segment of female.

from "The fleas (Siphonaptera) of Panama" by Tipton and Mendez, in "Ectoparasites of Panama", Field Museum of Natural History, Chicago (1966).

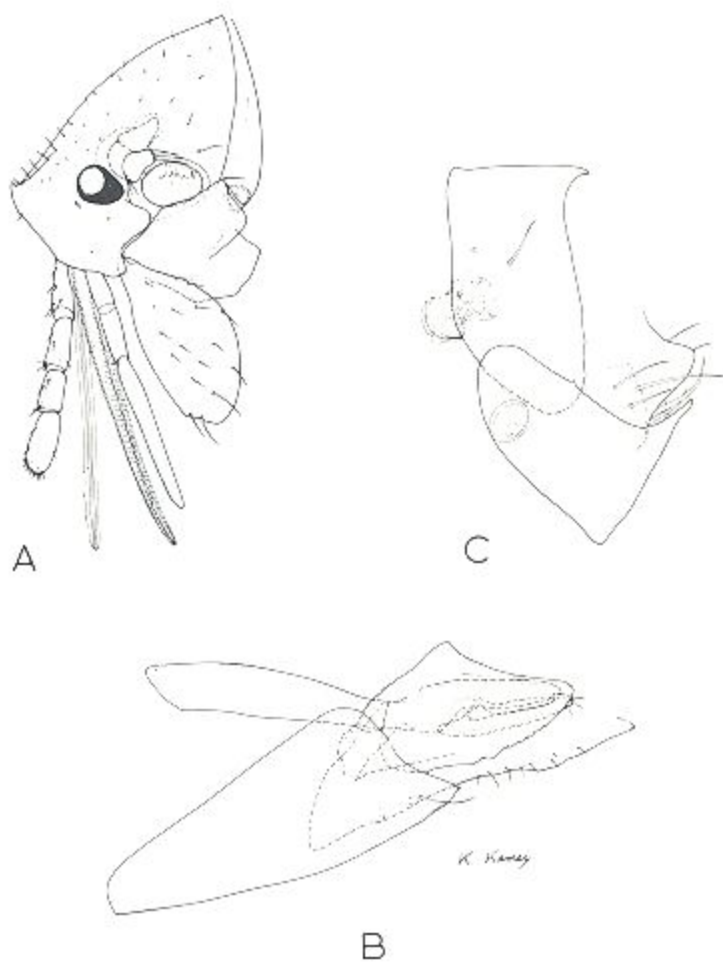


Fig. 11. *Tunga penetrans* (Linnaeus)

- A. Head, prothorax and procoxa of male.
- B. Part of male genitalia.
- C. Spermatheca and 7th abdominal segment of female.

from "The fleas (Siphonaptera) of Panama" by Tipton and Mendez, in "Ectoparasites of Panama", Field Museum of Natural History, Chicago (1966).