

Fleas (Insecta-Siphonaptera) of Chile: a review

JEAN-CLAUDE BEAUCOURNU¹, LUCILA MORENO² & DANIEL GONZÁLEZ-ACUÑA³

¹Laboratoire de Parasitologie et Zoologie appliquée, Faculté de Médecine and Institut de Parasitologie de l' Ouest, 2 avenue du Professeur Léon Bernard, 35043 Rennes Cedex, France. E-mail: jc.beaucournu@gmail.com

²Facultad de Ciencias Naturales y Oceanográficas, Departamento de Zoología, Universidad de Concepción, Chile.

³Corresponding author, Facultad de Ciencias Veterinarias, Universidad de Concepción, Avenida Vicente Méndez, 595, Chillán, Chile.
E-mail: dgonzalezacuna@gmail.com

Abstract

This study presents a revision of the fleas (Siphonaptera) in Chile, gathered from 1993–2013 in response to a request to update our knowledge of the fauna of this country, as catalogued by Beaucournu & Gallardo in 1991 and 1992. For each taxon we give the depository of the type, the main references concerning it, its general distribution, particularly in Chile, and its known hosts, mainly in this country. Our review of the existing literature on fleas of Chile gives information on a total of 8 families, 11 subfamilies, 31 genera, 9 subgenera and 112 species (with 11 subspecies). The hosts are represented by 21 families of mammals (91 species) and 16 of birds (27 species). In addition we present 21 new reports of fleas for Chile and 165 new localities.

Key words: Siphonaptera, review, Chile

Introduction

The "Catalogue provisoire des Puces du Chili (Insecta: Siphonaptera)" was published in two parts in 1991 and 1992 by Beaucournu & Gallardo. Since then we have been able to continue the study of the flea fauna of this country. New species have been described, particularly from birds. Other colleagues have helped to improve our knowledge of the fleas in this country and we must mention in particular the studies of Michael W. Hastriter and Marcela Lareschi and their team.

We wish to update our knowledge of the Chilean flea fauna, the species richness of which now stands at 112 taxa (the report of Alarcón (2000) listed 91 species but omitted Tungidae). However, it is certain that this list is not the final tally, even without the description of new taxa; other species present either in Argentina or Peru will eventually be included in the Chilean lists, e.g. *Dasypyllus lasius lasius*, *D. stejnegeri* (Ceratophyllidae), *Tiarapsylla* spp. (Stephanocircidae) and the Malacopsyllidae, only known in Argentina today.

The purpose of the present study is to offer a checklist that summarizes all described fleas in Chile, their hosts, depository of types, their general distribution and particularly their distribution in Chile. In addition, new host and geographic records from Chile are reported.

Material and methods

This list was prepared on the basis of data published from 1911 to present. Fleas are presented in order according to taxa; each record contains information on the species name, authority and year, deposit types, holotype, neallotype, references, distribution, and host. Localities are arranged alphabetically according to provinces (Figure 1). In addition, we present a table organized according to the host of the fleas (Table 1).

To supplement the checklist, and with the permission of the Chilean Government Sanitary Office (resolution 2012 and 1095), we captured fleas in different localities of Chile.

References

- Abarca, K. (1996) Enfermedad por arañazo de gato. *Revista Chilena de Infectología*, 13, 78–80.
- Alarcón, M.E. (2000) Estado actual del conocimiento de los siphonapteros presentes en Chile (Insecta: Siphonaptera). *Gayana*, 64, 1–7.
- Alarcón, M. & Muñoz, L. (2001) *Hectopsylla psittaci* (Siphonaptera: Tungidae) en Chile. *Revista de Biología Tropical*, 49 (3–4), 1284.
- Aramburu, R., Sanchez, J., Liljeström, M., Formoso, A. & Lareschi, M. (2009) Primer registro de *Dasypsyllus (Avesopsylla) lasius lasius* (Siphonaptera :Ceratophyllidae) en nidos de golondrina chilena, *Tachycineta meyenii* (Passeriformes : Hirundinidae), en Ushuaia (Tierra del Fuego, Argentina). *Revista de la Sociedad Entomológica Argentina*, 68, 377–380.
- Bazán-Léon, E.A., Lareschi, M., Sanchez, J., Soto-Nilo, G., Lazzoni, I., Venegas, C.I., Poblete, Y. & Vasquez, R.A. (2013) Fleas associated with non-flying small mammal communities from northern and central Chile: with new host and locality records. *Medical and Veterinary Entomology*, 27 (4), 450–459.
<http://dx.doi.org/10.1111/mve.12005>
- Beaucournu, J.-C. (1969) Sur quelques siphonaptères (*Insecta*) de Guyane française. *Archives de l'Institut Pasteur de Guyane*, 21, 363–366.
- Beaucournu, J.-C. (2002) *Heteropsyllus* n. subgen. pour *Tetrapsyllus satyrus* Beaucournu & Torrès-Mura, 1986 (Siphon., Rhopalopsyllidae). *Bulletin de la Société entomologique de France*, 107, 264.
- Beaucournu, J.-C. & Alcover, J.A. (1989 issued 1990) Puces récoltées dans la Province de Neuquén (Argentine); description de 4 nouveau taxa (*Insecta, Siphonaptera*). *Annales de Parasitologie humaine et comparée*, 64, 489–505.
- Beaucournu, J.-C., Ardiles, K. & Gonzalez-Acuña, D.A. (2009) Deux nouvelles espèces de *Dasypsyllus* (Siphonaptera: Ceratophyllidae) au Chili. *Parasite*, 16, 107–110.
<http://dx.doi.org/10.1051/parasite/2009162107>
- Beaucournu, J.-C., Belaz, S., Muñoz-Leal, S. & González-Acuña, D. (2013) A new flea, *Ectinorus (Ectinorus) insignis* n. sp. (Siphonaptera, Rhopalopsyllidae, Parapsyllinae), with notes on the subgenus *Ectinorus* in Chile and comments on unciform sclerotization in the Superfamily Malacopsylloidea. *Parasite*, 20 (35), 1–12
<http://dx.doi.org/10.1051/parasite/2013033>
- Beaucournu, J.-C. & Carmen-Castro, D. (2003) Deux nouveaux *Tiamastus* Jordan, 1939, d' Argentine (Siphonaptera, Rhopalopsyllidae). *Bulletin de la Société entomologique de France*, 108, 49–53.
- Beaucournu, J.-C., Degeilh, B., Mergey, T., Muñoz-Leal, S. & Gonzalez-Acuña, D. (2012) Le genre *Tunga* Jarocki, 1838 (Siphonaptera, Tungidae). I—Taxonomie, Phylogénie, Écologie, Rôle pathogène. *Parasite*, 19, 297–308.
<http://dx.doi.org/10.1051/parasite/2012194297>
- Beaucournu, J.-C. & Gallardo, M.H. (1978) Quelques nouvelles puces du Chili (Siphonaptera) parasites de *Ctenomys* (Rod. Octodontidae). *Bulletin de la Société de Pathologie exotique*, 70, 438–450.
- Beaucournu, J.-C. & Gallardo, M.H. (1988) Puces nouvelles d' Argentine (Insecta, Siphonaptera). *Revue suisse de Zoologie*, 95, 99–112.
- Beaucournu, J.-C. & Gallardo, M.H. (1989) Contribution à la faune du Chili; puces nouvelles de la moitié nord (Insecta, Siphonaptera). *Bulletin de la Société entomologique de France*, 94, 181–188.
- Beaucournu, J.-C. & Gallardo, M.H. (1991) Siphonaptères du Chili; description de 4 espèces nouvelles (Siphonaptera). *Bulletin de la Société entomologique de France*, 96, 185–203.
- Beaucournu, J.-C. & Gallardo, M.H. (1991) Catalogue provisoire des Puces du Chili (Insecta: Siphonaptera) (1ère partie). *Bulletin de la Société Française de Parasitologie*, 9, 237–270.
- Beaucournu, J.-C. & Gallardo, M.H. (1992) Catalogue provisoire des Puces du Chili (Insecta: Siphonaptera) (2ème partie). *Bulletin de la Société Française de Parasitologie*, 10, 93–130.
- Beaucournu, J.-C. & Gallardo, M.H. (2005) Deux puces nouvelles (Siphonaptera: Rhopalopsyllidae: Parapsyllinae) d' Argentine, parasites d' *Abro uspallata* Braun et Mares, 2002 (Rod.: Abrocomidae). *Parasite*, 12, 39–43.
<http://dx.doi.org/10.1051/parasite/2005121039>
- Beaucournu, J.-C., Gallardo, M.H. & Launay, H. (1986) Puces (Siphonaptera) nouvelles ou peu connues du Chili: description de *Plocopsylla diana* n. sp. (Stephanocircidae). *Annales de Parasitologie humaine et comparée*, 61, 359–366.
- Beaucournu, J.-C., Gallardo, M.H. & Ménier, K. (2004) Deux puces nouvelles du Chili et d' Argentine (Insecta-Siphonaptera: Stephanocircidae et Rhopalopsyllidae) et érection d' un sous-genre chez *Plocopsylla* Jordan, 1931. *Parasite*, 11, 249–252.
<http://dx.doi.org/10.1051/parasite/2004113249>
- Beaucournu, J.-C. & González-Acuña, D. (2005) *Ectinorus (E.) lagidium* n. sp., nouveau parasite de la Viscache *Lagidium viscacia* (Molina, 1782) (Rodentia, Chinchillidae) au Chili (Siphonaptera, Rhopalopsyllidae). *Bulletin de la Société entomologique de France*, 110, 399–401.
- Beaucournu, J.-C. & González-Acuña, D. (2010) Description de *Trochilosylla torresmurai* n. gen., n. sp. (Siphonaptera: Ceratophyllidae) du Chili, première mention d' une puce parasite d' oiseau-mouche (Aves : Trochilidae). *Parasite*, 17, 133–142.
<http://dx.doi.org/10.1051/parasite/2010172133>
- Beaucournu, J.-C., González-Acuña, D. & Gallardo, M.H. (2006) Notes sur les *Plocopsylla* (*Schrammapsylla*): rectification de la diagnose de *P. (S.) muruai* et clé de détermination des mâles (Siphonaptera, Stephanocircidae). *Bulletin de la Société*

- entomologique de France*, 111, 203–206.
- Beaucournu, J.-C. & Kelt, D.A. (1990) Contribution à la faune du Chili: puces nouvelles ou peu connues de la partie sud (Insecta, Siphonaptera). *Revue suisse de Zoologie*, 97, 647–668.
- Beaucournu, J.-C. & Launay, H. (1990) *Les Puces de France et du Bassin méditerranéen occidental*. Faune de France n° 76. Fédération Française des Sociétés de Sciences naturelles, Paris, 548 pp.
- Beaucournu, J.-C., Mergey, T., Muñoz-Léal, S. & González-Acuña, D. (2012) Description de *Tunga bonneti* n. sp. du Chili (Siphonaptera : Tungidae) et notes sur sa spécificité, sa chorologie, son dermecos et sa phénologie. *Parasite*, 19, 297–308. <http://dx.doi.org/10.1051/parasite/2012193207>
- Beaucournu, J.-C., Moreno, L. & González-Acuña, D. (2011) Deux espèces nouvelles de puces (Siphonaptera: Ctenophthalmidae & Rhopalopsyllidae) du Chili. *Parasite*, 18, 241–246. <http://dx.doi.org/10.1051/parasite/2011183241>
- Beaucournu, J.-C., Muñoz-Léal, S.A. & González-Acuña, D. (2012) *Dasypsyllus patagonicus* n. sp. de l' extrême sud du Chili (Siphonaptera, Ceratophyllidae). *Bulletin de la Société entomologique de France*, 117, 119–122.
- Beaucournu, J.-C., Reynes, J.M. & Vié, J.C. (1998) Fleas in French Guiana (Insecta: Siphonaptera). *Journal of Medical Entomology*, 35, 3–10.
- Beaucournu, J.-C. & Rodhain, F. (1990 issued 1991). *Parapsyllus senellarti* n. sp. (Siphonaptera, Rhopalopsyllidae) parasite d' Albatros à l' île Nouvelle-Amsterdam. *Annales de Parasitologie humaine et comparée*, 65, 279–281.
- Beaucournu, J.-C. & Torres-Mura, J.C. (1986) Un *Tetrapsyllus* nouveau du Chili (Siphonaptera, Rhopalopsyllidae). *Revue Française d' Entomologie*, N.S., 8, 9–12.
- Beaucournu, J.-C. & Torres-Mura, J.C. (1987 issued 1988). Un nouveau *Delostichus* (Siphonaptera, Rhopalopsyllidae) d' Argentine. *Bulletin de la Société Française de Parasitologie*, 5, 257–260.
- Beaucournu, J.-C., Torres-Mura, J.C. & Gallardo, M.H. (1988) Description de la femelle de *Ctenoparia topali* Smit, 1963 et clef dichotomique du genre *Ctenoparia* Rothschild, 1909 (Siphonaptera, Hystrichopsyllidae). *Annales de Parasitologie humaine et comparée*, 63, 380–383.
- Beaucournu, J.-C., Vergara, P., Balboa, L. & González-Acuña, D.A. (2006) Description d' une nouvelle puce d' Oiseau provenant du Chili (Siphonaptera: Ceratophyllidae). *Parasite*, 13, 227–230. <http://dx.doi.org/10.1051/parasite/2006133227>
- Blank, S.M., Kutzscher, C., Masello, J.F., Pilgrim, R. & Quillfeldt, P. (2007) Stick-tight fleas in the nostrils and below the tongue: evolution of an extraordinary infestation site in *Hectopsylla* (Siphonaptera : Pulicidae). *Zoological Journal of the Linnean Society*, London, 149, 117–137. <http://dx.doi.org/10.1111/j.1096-3642.2006.00239.x>
- Cheetham, T.B. (1988) Male genitalia and the phylogeny of the Pulicoidea (Siphonaptera). In: Fricke, R. (Ed.), *Theses Zoologicae. Vol. 8*. Koeltz Scientific Books, Koenigstein, Germany, 224 pp.
- Colombetti, P.L., Autino, A.G., Claps, G.I., Carma, M.I. & Lareschi, M. (2008) Primera cita de *Cleopsylla townsendi* (Siphonaptera : Craneopsyllinae) en la Argentina. *Revista de la Sociedad Entomológica Argentina*, 67, 179–182.
- Costa-Lima, A. & Hathaway, C.R. (1946). *Pulgas, bibliografia, catalogo e hospedadores*. Monografias Instituto Oswaldo Cruz, Rio de Janeiro, 4, 522 pp.
- Del Ponte, E. (1977) Notas sobre suctoria Argentinas VIII: Revision de las familias Hystrichopsyllidae, Stephanocircidae e Ischnopsyllidae (Ceratophylloidea). *Revista Museo Argentino Ciencias Naturales « Bernardino Rivadavia »*, Entomología, 5, 105–141.
- Eskey, C.R. (1932) Epidemiological Study of Plague in Peru, with Observations on the Anti-plague Campaign and Laboratory work. *United States Public Health Reports*, 47, 2191–2207. <http://dx.doi.org/10.2307/4580611>
- Floch, H. (1943) 7. *Pulicidés in Rapport sur le fonctionnement technique de l' Institut Pasteur de la Guyane française et du territoire de l' Inini, pendant l'année 1942*. Publication no. 60, 71 pp.
- Fox, C. (1929) Some new Siphonaptera. *Entomological News*, 40, 218.
- Guimarães, L.R. (1940) Notas sobre Siphonaptera e redescrição de *Polygenis occidentalis*. *Arquivos de Zoologia do Estado de São Paulo*, 2, 215–250.
- Hastriter, M.W. (2001a) Fleas (Siphonaptera: Ctenophthalmidae and Rhopalopsyllidae) from Argentina and Chile with two new species from the Rock Rat, *Aconaemys fuscus*, in Chile. *Annals of Carnegie Museum*, 70, 169–178.
- Hastriter, M.W. (2001b) *Ceratophyllus altus* Tipton and Mendez (Siphonaptera: Ceratophyllidae) in Chile, with notes on the distribution of the genus *Ceratophyllus* Curtis 1832 in the southern hemisphere. *Proceedings of the Entomological Society of Washington*, 103, 582–585.
- Hastriter, M.W., Alarcón, M.E. & Whiting, M.F. (2001) A collection of fleas (Siphonaptera) from the San Martin Reserve, Valdivia province, Chile. *Proceedings of the Entomological Society of Washington*, 103, 437–443.
- Hastriter, M.W. & Guerrero, R. (1998) A review of the bat flea genus *Hormopsylla* (Siphonaptera: Ischnopsyllidae). *Proceedings of the Entomological Society of Washington*, 100, 247–251.
- Hastriter, M.W. & Mendez, E. (2000) A review of the flea genera *Hectopsylla* Frauenfeld and *Rhynchopsyllus* Haller (Siphonaptera: Pulicidae). *Proceedings of the Entomological Society of Washington*, 102, 613–624.
- Hastriter, M.W. & Sage, R.D. (2011) Description of a new species of *Ectinorus* (*E. spiculatus*) (Siphonaptera, Rhopalopsyllidae) from Argentina and a review of the subgenus *Ichyonus* Smit, 1987. *Zookeys*, 124, 1–18.

- <http://dx.doi.org/10.3897/zookeys.124.1688>
- Hastriter, M.W. & Schlatter, R.P. (2006) Revision of the fleas in the subgenus *Dasypyllus* (*Neornipsyllus*) (Siphonaptera : Ceratophyllidae). *Annals of Carnegie Museum*, 75, 247–257.
[http://dx.doi.org/10.2992/0097-4463\(2006\)75\[247:rotfit\]2.0.co;2](http://dx.doi.org/10.2992/0097-4463(2006)75[247:rotfit]2.0.co;2)
- Hastriter, M.W., Zyzak, M.D., Soto, R., Fernandez, R., Solorzano, N. & Whiting, M.F. (2002) Fleas (Siphonaptera) from Ancash Department, Peru with the description of a new species, *Ectinorus alejoi* (Rhopalopsyllidae) and the description of the male of *Plocopsylla pallas* (Rothschild, 1914) (Stephanocircidae). *Annals of Carnegie Museum*, 71, 87–106.
- Holland, G.P. (1984) The Fleas of Canada, Alaska and Greenland (Siphonaptera). *Memoirs of the Entomological Society of Canada*, 117 (Supplement S130), 1–631.
<http://dx.doi.org/10.4039/entm117130fv>
- Holland, G.P. (1971) New Siphonaptera from south Mexico. *Canadian Entomologist*, 103, 95–104.
<http://dx.doi.org/10.4039/ent10395-1>
- Hopkins, G.H.E. (1951) Notes on fleas. *Annals and Magazine of Natural History*, 4, 529–544.
<http://dx.doi.org/10.1080/00222935108654183>
- Hopkins, G.H.E. & Rothschild, M. (1953) *An Illustrated Catalogue of the Rothschild Collection of fleas (Siphonaptera) in the British Museum (Natural History)*. Vol. I. Tungidae and Pulicidae. British Museum, London, 361 pp.
- Hopkins, G.H.E. & Rothschild, M. (1956) *An Illustrated Catalogue of the Rothschild Collection of fleas (Siphonaptera) in the British Museum (Natural History)*. Vol. II. Coptopsyllidae, Vermipsyllidae, Stephanocircidae, Ischnopsyllidae, Hypsophthalmidae and Xiphiosyllidae. British Museum, London, 455 pp.
- Hopkins, G.H.E. & Rothschild, M. (1966) *An Illustrated Catalogue of the Rothschild Collection of fleas (Siphonaptera) in the British Museum (Natural History)*. Vol. IV: Hystrichopsyllidae (Ctenophthalminae, Dinopsyllinae, Doratopsyllinae and Listropsyllinae). British Museum, London, 549 pp.
- Hopkins, G.H.E. & Rothschild, M. (1971) *An Illustrated Catalogue of the Rothschild Collection of fleas (Siphonaptera) in the British Museum (Natural History)*. Vol. V. Leptopsyllidae and Ancistrosyllidae. British Museum, London, 530 pp.
- Hopla, C.E. (1980) A study of the host associations and zoogeography of *Pulex*. In: Traub, R. & Starcke, H. (Eds.), *Fleas, Proceedings of the International Conference on Fleas*, A.A. Balkema, Rotterdam, pp 185–207.
- Jameson, E.W. & Fulk, G.W. (1977) Notes on some fleas (Siphonaptera) from Chile. *Journal of Medical Entomology*, 14, 401–406.
- Johnson, P.T. (1956) *Myodopsylla setosa* and *Tiarapsylla bella*, new species of fleas from Peru. *Journal of the New York Entomological Society*, 62, 193–205.
- Johnson, P.T. (1957) A classification of the Siphonaptera of South America. *Memoirs of the Entomological Society of Washington*, 5, 299 pp.
- Jordan, K. (1931) Three new South American fleas. *Novitates Zoologicae*, 36, 311–316.
- Jordan, K. (1936) Some Siphonaptera from South America. *Novitates Zoologicae*, 39, 305–310.
- Jordan, K. (1939) On five new Siphonaptera from the Republic of Argentina. *Novitates Zoologicae*, 41, 292–303.
- Jordan, K. (1942a) On the Siphonaptera collected by Dr. J.M. de la Barrera in the province of Mendoza during 1939. *Revista Instituto Bacteriologico «Dr. Carlos G. Malbran»*, 10, 401–460.
- Jordan, K. (1942b) On *Parapsyllus* and some closely related genera of Siphonaptera. *Eos*, 18, 7–29.
- Jordan, K. (1950) Notes sur une collection de puces provenant du Pérou. *Bulletin de l' O.M.S.*, 2, 633–646.
- Jordan, K. (1953) On a very remarkable flea from Argentina. *Bulletin of the British Museum (Natural History), Entomology*, 3, 179–186.
- Jordan, K. & Rothschild, N.C. (1908) Revision of the non-combed eyed Siphonaptera. *Parasitology*, 1, 1–100.
<http://dx.doi.org/10.1017/s0031182000003280>
- Jordan, K. & Rothschild, N.C. (1911) Katalog der Siphonapteren des königlichen zoologischen Museums in Berlin. *Novitates Zoologicae*, 18, 57–89.
- Jordan, K. & Rothschild, N.C. (1920) On American bird-Ceratophylli. *Ectoparasites*, 1, 65–76.
- Jordan, K. & Rothschild, N.C. (1923) New American Siphonaptera. *Ectoparasites*, 1, 309–319.
- Krasnov, B.R. (2008) *Functional and evolutionary ecology of Fleas*. Cambridge University Press, Cambridge, UK, 609 pp.
- Labruna, M.B., Ogrzewalska, M., Moraes-Filho, J., Lepe, P., Gallegos, J.L. & López, J. (2007) *Rickettsia felis* in Chile. *Emerging Infection Disease*, 13, 1794–1795.
<http://dx.doi.org/10.3201/eid1311.070782>
- Lareschi, M., Autino, A.G., Diaz, M.M. & Marquez, R.M. (2011) Taxonomy and Distribution of *Nonnapsylla* Wagner, 1938 (Stephanocircidae: Craneopsyllinae). *Journal of Parasitology*, 97, 954–955.
<http://dx.doi.org/10.1645/ge-2738.1>
- Lareschi, M. & Linardi, P.M. (2009) Morphological variability in *Polygenis* (*Polygenis*) *platensis* (Jordan & Rothschild) (Siphonaptera: Rhopalopsyllidae: Rhopalopsyllinae) and taxonomic consequences. *Zootaxa*, 2310, 35–42.
- Lewis, R.E. (1967) Contribution to a taxonomic revision of the genus *Nosopsyllus* Jordan, 1933 (Siphonaptera : Ceratophyllidae). 1: African species. *Journal of Medical Entomology*, 4, 123–142.
- Lewis, R.E. (1974) Notes on the geographical distribution and host preferences in the Order Siphonaptera. Part 4. Coptopsyllidae, Pygiopsyllidae, Stephanocircidae and Xiphiosyllidae. *Journal of Medical Entomology*, 11, 403–413.
- Lewis, R.E. (1976) A review of the South American flea subgenus *Ectinorus* Jordan, 1942, with descriptions of two new

- species and a key (Siphonaptera: Rhopalopsyllidae). *The Journal of Parasitology*, 62, 1003–1009.
<http://dx.doi.org/10.2307/3279199>
- Lewis, R.E. & Eckerlin, R.P. (2013) A review of the mustelid-infesting fleas in the family Ceratophyllidae (Insecta : Siphonaptera). *Annals of Carnegie Museum*, 81, 119–134.
<http://dx.doi.org/10.2992/007.081.0201>
- Lewis, R.E. & Spotorno, A.E. (1984) A new subspecies of *Agastopsis nylota* (Siphonaptera : Hystrichopsyllidae) from Chile, with a key to the known taxa. *Journal of Medical Entomology*, 21, 392–394.
- Linardi, P.M. & Guimarães, L.R. (2000) *Sifonápteros do Brasil*. Museu de Zoologia—USP, FAPESP, São Paulo, 291 pp. [Brazil]
- Macchiavello, A. (1932) Ensayo sobre la peste en Chile. Conferencia dictada en la Sociedad de Microbiología, Santiago, 5 de enero, 1932. Available from: <http://hist.library.paho.org/Spanish/BOL/v11n9p909.pdf> (accessed 28 October 2014)
- Macchiavello, A. (1948) Siphonaptera de la Costa Sur-Occidental de America (Primera lista y distribucion zoo-geografica). *Boletin de la Oficina Sanitaria Panamericana*, 27, 412–460.
- Mendez, E. (1977) Mammalian-siphonapteran associations, the environment, and biogeography of mammals of southwestern Colombia. *Questiones Entomologicae*, 13, 91–182.
- Ménier, K. & Beaucournu, J.-C. (1999) Approche biogéographique du genre *Ctenocephalides* Stiles et Collins, 1930. *Biogeographica*, 75, 79–88.
- Navarrete, M., Täger, M.P., Wenzel, M.S.A., Podestá, L.L., Pincheira, M.P. & Zaror, L.C. (2003) Formas atípicas de enfermedad por arañazo de gato, Valdivia. *Revista Chilena de Infectología* 20, 257–261.
<http://dx.doi.org/10.4067/s0716-10182003000400006>
- Pérez-Martínez, L., Venzal, J.M., González-Acuña, D., Portillo, A., Blanco, J.R. & Oteo, J.A. (2009) *Bartonella rochalimae* and other *Bartonella* spp. in fleas, Chile. *Emerging Infectious Diseases*, 15, 1150–1151.
<http://dx.doi.org/10.3201/eid1507.081570>
- Reise, D. & Gallardo, M.H. (1990) A taxonomic study of the South American genus *Euneomys* (Cricetidae, Rodentia). *Revista Chilena de Historia Natural*, 63, 73–82.
- Rothschild, N.C. (1898) Contributions to the knowledge of the Siphonaptera. *Novitates Zoologicae*, 5, 533–545.
- Rothschild, N.C. (1903) New species of Siphonaptera from Egypt and the Sudan. *Entomologist's Monthly Magazine*, 2, 83–87.
- Rothschild, N.C. (1903) Further contributions to the knowledge of Siphonaptera. *Novitates Zoologicae*, 10, 317–325.
- Rothschild, N.C. (1904) Description of a new species of Siphonaptera from South America. *Revista Chilena de Historia Natural*, 8, 147.
- Rothschild, N.C. (1908) New Siphonaptera. *Proceedings of the Zoological Society of London*, 617–629.
<http://dx.doi.org/10.1111/j.1469-7998.1908.tb07395.x>
- Rothschild, N.C. (1909) Two new species of *Stephanocircus* from South America. *Entomologist's Monthly Magazine*, 20, 8–10.
- Rothschild, N.C. (1909) On some American, Australian, and Palearctic Siphonaptera. *Novitates Zoologicae*, 16, 61–68.
- Rothschild, N.C. (1911) Some new genera and species of Siphonaptera. *Novitates Zoologicae*, 18, 117–122.
- Rothschild, N.C. (1914) New Siphonaptera from Peru. *Novitates Zoologicae*, 21, 239–251.
- Sanchez, J., Amor, V., Bazán-León, E.A., Vasquez, R.A. & Lareschi, M. (2012) Redescription of *Neotyphloceras chilensis* Jordan, new status (Siphonaptera : Ctenophthalmidae: Neotyphloceratinae). *Zootaxa*, 3259, 51–57.
- Sanchez, J.P. & Lareschi, M. (2013) The Fleas (Insecta : Siphonaptera) Parasites of Sigmodontine Rodents (Cricetidae) from Northern Patagonia, Argentina. *Comparative Parasitology*, 80, 110–117.
<http://dx.doi.org/10.1654/4576.1>
- Schramm, B.A. & Lewis, R.E. (1987) Four new species of *Plocopsylla* (Siphonaptera: Stephanocircidae) from South America. *Journal of Medical Entomology*, 24, 399–407.
- Schramm, B.A. & Lewis, R.E. (1988) Revision of *Plocopsylla* (Siphonaptera: Stephanocircidae). In: Fricke, R. (Ed.), *Theses Zoologicae. Vol. 9*. Koeltz Scientific Books, Koenigstein, Germany, 157 pp.
- Schwann, T.G. (1992) *Xenopsylla bantorum* is an East African subspecies of *X. cheopis* (Siphonaptera: Pulicidae). *Journal of Parasitology*, 29, 927–933.
- Smit, F.G.A.M. (1953a) Descriptions of new and little-known Siphonaptera. *Bulletin of the British Museum (Natural History), Entomology*, 3, 187–219.
- Smit, F.G.A.M. (1953b) Notes on the flea *Nosopsyllus londiniensis* (Rothschild) (Siphon., Ceratophyllidae) in Great Britain. *Entomologist's Monthly Magazine*, 89, 255–257.
- Smit, F.G.A.M. (1955) Siphonaptera from Bariloche, Argentina, collected by Dr. J.M. de la Barrera in 1952–1954. *Transactions of the Royal Entomological Society of London*, 107, 319–339.
<http://dx.doi.org/10.1111/j.1365-2311.1955.tb00482.x>
- Smit, F.G.A.M. (1958) A preliminary note on the occurrence of *Pulex irritans* L. and *Pulex simulans* in North America. *Journal of Parasitology*, 44, 523–526. <http://dx.doi.org/10.2307/3274425>
- Smit, F.G.A.M. (1962) A new sand-flea from Ecuador. *The Entomologist*, 95, 89–93.
- Smit, F.G.A.M. (1963) The Zoological results of Gy. Topal's Collecting in South Argentina. *Annales Historico-naturales Musei Nationalis Hungarici*, 55, 421–433.
- Smit, F.G.A.M. (1968) Siphonaptera taken from formalin-traps in Chile. *Zoologisches Anzeiger*, 180, 220–228.
- Smit, F.G.A.M. (1978) A new bird-flea from Peru. *Zoological Journal of the Linnean Society*, 62, 189–192.

- <http://dx.doi.org/10.1111/j.1096-3642.1978.tb01037.x>
- Smit, F.G.A.M. (1982) Classification of the Siphonaptera. In: Parker S.P. (Ed.) *Synopsis and classification of living organisms*, McGraw-Hill, New-York, pp. 557–563.
- Smit, F.G.A.M. (1987) *An Illustrated Catalogue of the Rothschild Collection of fleas Siphonaptera) in the British Museum (Natural History). Vol. VII. Malacopsylloidea (Malacopsyllidae and Rhopalopsyllidae)*. Oxford University Press, Oxford & Londres, 380 pp.
- Smit, F.G.A.M. & Rosický, B. (1972) Some Siphonaptera from Chile. *Folia Parasitologica*, 19, 365–368.
- Smit, F.G.A.M. & Wright, A.M. (1978) *A list of code numbers of species and subspecies of Siphonaptera*. Department of Entomology, British Museum, 48 pp. [doc. Roneotypé]
- Tipton, V.J. & Machado-Allison, C.E. (1972) *Fleas of Venezuela. Brigham Young University Science Bulletin*, 17, 1–115.
- Traub, R. (1952) Records and descriptions of fleas from Peru (Siphonaptera). *Proceedings of the Entomological Society of Washington*, 54, 1–22.
- Traub, R. & Gammons, J.G. (1950) Two new fleas of the family Tungidae. *Journal of Parasitology*, 36, 270–273.
<http://dx.doi.org/10.2307/3273157>
- Traub, R., Rothschild, M. & Haddow, J.F. (1983) *The Rothschild Collection of fleas, the Ceratophyllidae: key to the genera and host relationships, with notes on their evolution, zoogeography and medical importance*. Academic Press, London, xv + 288 pp.
- Wagner, J. (1933) Aphanipteren-Material aus der Sammlung des zoologischen Museums der Berliner Universität. *Mitteilungen des Zoologischen Museums der Berliner Universität*, 18, 338–362.
<http://dx.doi.org/10.1002/mmnz.19320180305>
- Wagner, J. (1938) Eine neuer Art "helmgragender" Flöhe aus Bolivien. *Zeitschrift für Parasitenkunde*, 10, 132–137.
<http://dx.doi.org/10.1007/bf02122227>
- Whiting, M.F., Whiting, A.S., Hastriter, M.W. & Dittmar, K. (2008) A molecular phylogeny of fleas (Insecta: Siphonaptera). *Cladistics*, 24, 1–31.
<http://dx.doi.org/10.1111/j.1096-0031.2008.00211.x>