RESEARCH NOTE

Geographical Distribution by Biomes of some Marsupial Siphonaptera from the State of Paraná, Brazil

Darci Moraes Barros-Battesti/+, Marcia Arzua*

Laboratório de Artrópodes, Instituto Butantan, Av. Vital Brasil 1500, 05503-900 São Paulo, SP, Brasil
*Museu de História Natural Capão da Imbuia, Departamento de Zoológico, Prefeitura Municipal de Curitiba, Rua Benedito Conceição 407, 828l0-080 Curitiba, PR, Brasil

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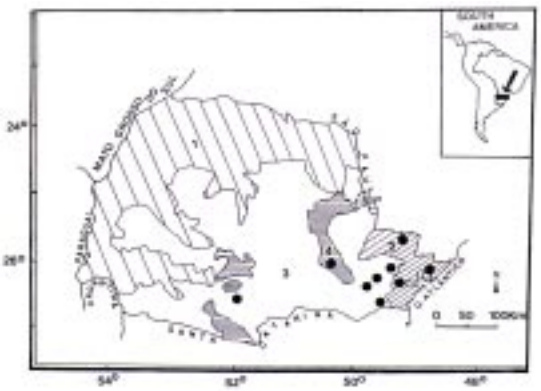
There is little information about fleas infesting marsupials in Brazil. The host/parasite relationships and range of siphonapteras are better known from rodents, which are the chief hosts to most Rhopalopsyllidae fleas. This was shown by PM Linardi (1984 *Rev Bras Biol 44*: 329-334) when relating Rhopalopsyllidae species and subspecies to hosts, and recording infestation rates in addition to flea taxonomy and phylogeny (PM Linardi 1985 *Rev Bras Biol 45*: 73-78). In the Brazilian State of Paraná, the first study on fleas of wild animals was published by DM Barros et al. (1993 *J Med Entomol 30*: 1068-1070). The present paper aims to contribute with some information about fleas of marsupials and their distribution in relation to different vegetative zones within Paraná.

From 1992 to 1995, marsupials were captured with 15 live-trap cages baited with bacon or ripe bananas placed on the ground in 3 vegetative zones, during 3 days in each municipality. In Curitiba, capital of the State, 3 days gatherings were held monthly during 1995. Fifteen traps were randomly placed in houses' ceilings and surrounding vegetation. The areas were numbered and selected using the table of aleatory numbers (JSC Pereira & WO Bussab 1985, *Tábuas de Estatística*, Harbra Harper & Row do Brasil, São Paulo, 20 pp.). Some opossums were captured alive by local residents and taken to the Zoo Department in Curitiba. Animals were anaesthetized with ether and combed over white sink. Collected fleas were mounted in slides (SB Pessôa & AV Martins 1978, *Parasitologia Médica*, 10th ed., Guanabara Koogan, Rio de Janeiro, 986 pp.). The fleas were identified by the keys presented in Pessôa and Martins (*loc. cit.)* and FGAM Smit (1987, *An Illustrated Catologue of the Rothschild Collection of Fleas (Siphonaptera) in the British Museum (Natural History)* VII, Oxford University Press, Oxford & London, 380 pp.). The nomenclature proposed for marsupial was based in DE Wilson and DM Reeder (1993, *Mammals Species of the World: A Taxonomic and Geographic Reference*, 2nd ed., Smithsonian Institutions, 1207 pp.). The siphonaptera as well as the marsupials' skin and skulls, except the opossums' were deposited into the Capão da Imbuia Museum of Natural History collection. For Rhopalopsyllinae genera and subgenera the nomenclature proposed by PM Linardi and LR Guimarães (1993 *J Med Entomol 30*: 161-170) has been followed.

In total, 231 fleas representing 10 species were gathered in 70 marsupials from 9 municipalities. The accompanying map shows the 5 vegetative zones in Paraná, according to the Brazilian Institute of Geography and Statistics (Instituto Brasileiro de Geografia e Estatística 1992), with the research locations indicated by the symbol (•). The regions numbers 1 and 5 were not investigated. Biomes and their respective municipalities where hosts and siphonaptera were collected, including the period, are listed below.



Vegetative zones in the State of Paraná, Brazil - 1: seasonal semideciduous forest; 2: Atlantic forest; 3: *Araucaria angustifolia* forest; 4: steppe; 5: savanna. (•) localities of marsupial'captures.

+Corresponding author. Fax: + 55-11-815.1505
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Atlantic forest

Morretes - October 1992 - Captured: *Monodelphis* spp., *D. marsupialis*, *Lutreolina crassicaudata* and *Marmosa cinerea*, 1 specimen of each species. Only *D. marsupialis* was infested, by *Xenopsylla cheopis* (Pulicidae) fleas. With a cosmopolitan range, this species is common in urban rodents and responsible for the transmission of bubonic plague in endemic areas from the northeastern Brazil.

Guaraqueçaba - January 1993 - One non-infected *Philander opossum* marsupial was collected.

Adrianópolis - May 1993 - Captured: 3 *D. marsupialis* without ectoparasites and 1 *P. opossum* infected by 2 fleas Hystrichopsyllidae: *Adoratopsylla* (*Adoratopsylla*) *antiquorum antiquorum* and *A.* (*Tritopsylla*) *intermedia intermedia*. This is the first record of *A. intermedia* in Paraná. This species was registered by PM Linardi et al. (1991 *J Med Entomol 28*: 183-185) on *L. crassicaudata* from the State of Santa Catarina, in Atlantic forest area. *A. antiquorum* species was recorded for the second time in Paraná, in the municipality of Mandirituba (*Araucaria angustifolia* forest area) its southern spread limit (Barros et al. *loc. cit.*).

Steppe

Ponta Grossa - May 1992 - Captured: 1 *D. albiventris* with 1 *Rhopalopsyllus lutzi lutzi* (Rhopalopsyllidae) flea and 3 *L. crassicaudata* infested by 1 *Craneopsylla minerva minerva* (Stephanocircidae), 1 *Polygenis axius axius* and 3 *P. tripus*, both of the Rhopalopsyllidae family. The spread for *R. lutzi* includes the Cerrado and the Atlantic forest; *P. axius* occurs in the Pampas and the spread of *P. tripus* includes the Cerrado and Caatinga (Linardi 1987 *loc. cit.*). *P. axius* and *P. tripus*, also found in the Atlantic forest, are being recorded in Steppe for the first time and are new records for Paraná. Both *R. lutzi* and *C. minerva* have already been recorded in Paraná, in *A. angustifolia* forests, by Barros et al. (*loc. cit.*).

***Araucaria angustifolia* forests**

The marsupials captured in *Tijucas do Sul* - January 1992 - (3 *D. marsupialis*), *Araucária* - April 1992 - (2 *D. marsupialis* and 1 *P. opossum*), and *Pinhão* - March 1994 - (1 *Monodelphis* spp. and 1 *P. opossum*) were negative to siphonaptera.

Quatro Barras - February 1992 - The only *D. albiventris* captured in this municipality was infected by 1 *C. minerva* and 6 *Polygenis* (*Neopolygenis*) *atopus*. In other areas, *P. atopus* shows preference for marsupials, getting to a 77% infestation rate in *Didelphis* sp. (CE Machado-Allison 1962 *Acta Biol Venez 3*: 173-193). This is the first record of the species in Paraná.

Curitiba - January to December 1995 - Of the 43 *D. albiventris*, 32 specimens were infected by 10 *C. minerva* (4.3%), 128 *Ctenocephalides felis felis* (55.4%) (Pulicidae), 1 *R. lutzi* (0.4%) and 11 *Polygenis* (*P.*) *rimatus rimatus* (4.8%) (Rhopalopsyllidae). The last species, already recorded in Paraná (Barros et al. *loc. cit.*), spreads broadly in the Pampas and Atlantic, *A. angustifolia* and rain forest biomes (Linardi 1987 *loc. cit.*). 1 *Monodelphis* spp. without ectoparasites, 2 *D. marsupialis* and 2 *Didelphis* sp., both infected by 64 *C. felis*, with a frequency rate of 20.3% and 7.3%, respectively. *C. felis* is common in cats and dogs and has been pointed as the intermediate host for nematode and cestode parasites, as well as vector for murine typhus (W Jellison 1959 *Ann Rev Ent 4*: 389-414). This species, found only in Curitiba opossums, represents 83.1% of the collected fleas. This indicates that these mammals are living too close to dwellings, what may cause human health problems.

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