

## The Enemy Release Hypothesis and *Callosciurus erythraeus* in Argentina: combining community and biogeographical parasitological studies

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**Table S1. Parasite species (n=33) recorded for *C. erythraeus* in its native range, showing the known distribution of ectoparasite species, the subspecies of *C. erythraeus* acting as host of helminths, the collection site of *C. erythraeus*, and the sources for each recorded parasite**

Ectoparasite species	Ectoparasites' known distribution	Collection site	References
<b>Insecta</b>			
<b>Siphonaptera</b>			
Stivaliidae			
<i>Medwayella robinsoni</i>	Malayan and Indo-Chinese subregions; Malaysia, Thailand <sup>1</sup>	Malayan peninsula	Shinozaki et al. 2004
Ceratomyzidae			
<i>Macrostylophora euteles</i>	Indo-Chinese and East Asian subregions; China <sup>1</sup>	China	Jordan 1932; Durden and Beaucournu 2014
<i>Macrostylophora bispiniforma</i>	East Asian subregion; China <sup>1</sup>	China	Li et al. 1976; Durden and Beaucournu 2014
<i>Macrostylophora liae</i>	East Asian subregion; China <sup>1</sup>	Southeast Asia	Traub 1972; Durden and Beaucournu 2014
<i>Macrostylophora cuiiae</i>	East-Asian subregion; China <sup>1</sup>	China	Liu et al. 1964 in Durden and Beaucournu 2014
<i>Macrostylophora hastata malayensis</i>	Indo-Chinese and East-Asian subregions; Malaysia, Nepal, Laos, China, Vietnam <sup>1</sup>	West Malaysia	Durden and Beaucournu 2014
<i>Macrostylophora lupata lupata</i>	East-Asian subregion; Nepal <sup>1</sup>	India, Nepal, Sikkim	Durden and Beaucournu 2014
<i>Macrostylophora lupata bamana</i>	Indo-Chinese subregion; Mien <sup>1</sup>	Myanmar	Durden and Beaucournu 2014
<i>Megathoracipsylla pentagonia</i>	East Asian subregion; China <sup>1</sup>	China	Liu et al. 1982
<b>Anoplura</b>			
Enderleinellidae			
<i>Enderleinellus corrugatus</i>	China, Hainan Island, Thailand (southern Asia) <sup>2,3</sup>	China, Thailand	Chin 1979; Durden and Musser 1994
Hoplopleuridae			
<i>Hoplopleura erismata</i>	India, Malaysia, China, Thailand (southern Asia) <sup>2,3</sup>	China	Blagoveshchenskiy 1972; Durden and Musser 1994.
Polyplacidae			
<i>Neohaematopinus callosciuri</i>	Borneo, Malaysia, China, Taiwan, Thailand (southern Asia) <sup>2,3</sup>	Thailand, China	Blagoveshchenskiy 1972; Durden and Musser 1994; Zuo et al. 2011
<b>Arachnida</b>			
<b>Acari, Parasitiformes</b>			
<b>Mesostigmata</b>			
Laelapidae			
<i>Laelaps nuttalli</i>	Worldwide <sup>4</sup>	China	Huang et al. 2010
<i>Laelaps turkestanicus</i>	Asia, former USSR <sup>4</sup> , China <sup>5</sup>	China	Huang et al. 2010
<i>Laelaps traubi</i>	China <sup>5</sup>	China	Huang et al. 2010
<i>Eulaelaps dremomydis</i>	China <sup>5</sup>	China	Huang et al. 2010
<i>Hypoaspis pavlovskii</i>	China <sup>5</sup>	China	Huang et al. 2010
Haemogamasidae			
<i>Haemogamasus kitanoi</i>	Asia, Russia <sup>5</sup>	Taiwan	Allred 1969 in Shinozaki et al. 2004
<i>Haemogamasus dorsalis</i>	China <sup>5</sup>	China	Huang et al. 2010
<i>Haemogamasus oliviformis</i>	China <sup>5</sup>	China	Huang et al. 2010
<b>Ixodida</b>			
Ixodidae			
<i>Ixodes kuntzi</i>	Nepal, Taiwan <sup>6,7</sup>	Taiwan	Hoogstraal and Kohls 1965

Helminth species	Host subspecies	Collection site	References
<b>Nematode</b>			
<b>Strongylida</b>			
Heligmosomidae			
<i>Calypsostrongylus titasuthi</i>	<i>Callosciurus flavimanus</i> <sup>8</sup>	Thailand	Kliks and Durette-Desset 1976
<i>Calypsostrongylus ogdeni</i>	<i>C. e. centralis</i> ; <i>C. e. taiwanensis</i> ; <i>C. e. roberti</i>	Taiwan	Schmidt et al. 1967
<i>Brevistriata skrjabini</i>	<i>C. e. taiwanensis</i>	Taiwan	Myers and Kuntz 1964
<i>Brevistriata sinensis</i>	<i>C. e. castaneiventris</i> ; <i>C. e. gordonii</i>	China	Li 1941 in Durette-Desset 1970; Yen 1973 in Lurz et al. 2013
<i>Brevistriata callosciuri</i>	<i>C. e. ningpoensis</i>	China	Wang 1981
Trichostrongylidae			
<i>Trichostrongylus columbriformis</i> <sup>9</sup>	<i>C. e. gordonii</i> ; <i>C. e. michianus</i>	China	Yen 1973 in Lurz et al. 2013
<b>Spirurida</b>			
<i>Protospirura</i> sp. <sup>10</sup>	<i>C. e. centralis</i> ; <i>C. e. roberti</i> ;	Taiwan	Myers and Kuntz, 1964
Rictulariidae			
<i>Rictularia tani</i> <sup>11</sup> Hoenpli, 1929	<i>C. e. gordonii</i> ; <i>C. e. michianus</i>	China	Yen 1973 in Lurz et al. 2013
Gongylonematidae			
<b>Rhabditida</b>			
Oxyuridae			
<i>Syphacia obvelata</i> <sup>12</sup>	<i>C. e. sub.?</i>	Taiwan	Myers and Kuntz 1964
<i>Enterobius</i> sp. <sup>13</sup>	<i>C. e. roberti</i>	Taiwan	Myers and Kuntz 1964
Trematode			
Plagiorchiida			
Dicrocoelidae			
<i>Zonorchis taiwanensis</i>	<i>C. e. centralis</i>	Taiwan	Fischthal and Kuntz 1981
<i>Zonorchis callosciuri</i>	<i>C. e. sub.?</i>	Vietnam	Fischthal and Kuntz 1981

(1) Medvedev et al. 2011; (2) Durden and Musser 1994; (3) Orrell 2011; (4) Strandtmann and Wharton 1958; (5) Huang et al. 2010; (6) Kolonin 2009; (7) Guglielmone et al. 2003; (8) Corresponds to *Callosciurus erythraeus taiwanensis* (Corbet and Hill 1992); (9) Cosmopolite parasite of ruminants (Anderson 2000); (10) Heteroxenous genus present mainly in rodents and carnivores (Anderson 2000); (11) Corresponds to *Pterygodermatites (Mesoplectes) tani* (Hoenpli, 1929) (Quentin 1969); (12) Common parasitic nematode with a direct life cycle, inhabiting the cecum of feral domestic mice *Mus musculus domesticus* (Tattersall et al. 1994 in Pisanu et al. 2002); (13) Enterobiinae occurs in both Old and New World Primates and rodents of the family Sciuridae (Hugot et al. 1995) but members of the genus *Enterobius* are found in catarrhine primates and Ethiopian Sciuridae (Anderson 2000).

#### References not included in the main text

Anderson RC (2000) Nematodes Parasites of Vertebrates, their Development and Transmission. CAB International, Wallingford, UK.

Corbet GB, Hill JE (1992) The mammals of the Indomalayan Region: A Systematic Review. Oxford University Press, Oxford.

Guglielmone AA, Estrada-Peña A, Keirans JE, Robbins RG (2003) Ticks (Acari: Ixodidae) of the Neotropical Zoogeographic Region. International Consortium on Ticks and Tick-Borne Diseases. Atalanta, Houten, The Netherlands.

Hugot JP, Gardner SL, Morand S (1995) The Enterobiinae subfam. nov. (Nematoda, Oxyurida) pinworm parasites of primates and rodents. Int J Parasitol 26:147-159.

Kolonin GV (2009) Fauna of Ixodid tick of the world (Acari, Ixodidae). Moscow. <http://www.kolonin.org>. Accessed 20 September 2011.

Medvedev S, Lobanov A, Lyangouzov I (2020) Parhost: Parhost World Database of Fleas (version 2, Nov 2005). In: Species 2000 & ITIS Catalogue of Life, 2020-06-04 Beta Roskov Y, Ower G Orrell T, Nicolson D, Bailly N, Kirk PM, Bourgoin T, DeWalt R.E, Decock W, Nieukerken E, van, Penev L (eds.). Digital resource at [www.catalogueoflife.org/col](http://www.catalogueoflife.org/col). Species 2000: Naturalis, Leiden, the Netherlands. ISSN 2405-8858.

Orrell, T (2011) ITIS: The Integrated Taxonomic Information System (version Apr 2011). Species 2000 & ITIS Catalogue of Life, 5th December 2011 Bisby FA, Roskov YR, Orrell TM, Nicolson D, Paglinawan LE, Bailly N, Appeltans W, Kirk PM, Bourgoin T, Baillargeon G, Ouvrard D (eds). Digital resource at <http://www.catalogueoflife.org/col>. Species 2000: Reading, UK. Accessed 20 September 2017.

Pisanu B, Chapuis JL, Durette-Desset MC, Morand S (2002) Epizootiology of *Syphacia obvelata* from a Domestic Mouse Population on the Subantarctic Kerguelen Archipelago. J Parasitol 88:645-649.

Quentin JC (1969) Essai de classification des nematodes rictulaires. Mém Mus natl hist nat 54:55-115.