

## Arthropod and Helminth Parasites of the Wild Guinea Pig, *Cavia aperea*, From the Andes and the Cordillera in Peru, South America

Katharina Dittmar, Institute of Parasitology, Veterinary Faculty, University of Leipzig, An den Tierkliniken 33, 04275 Leipzig, Germany. e-mail: katharinad@hotmail.com

**ABSTRACT:** As part of an ongoing research project concerning the diversity and distribution of parasites of Caviidae in South America, 143 wild guinea pigs (*Cavia aperea*) were collected from 3 localities in the Andean Highlands of Peru. Samples were collected between November 1996 and May 1999 and included representatives of arthropods, nematodes, and trematodes. Seven species of arthropods: *Leptopsylla segnis* (27.3%), *Tiamastus cavicola* (6.9%), *Gliricola porcelli* (55.2%), *Hoplopleura alata* (6.9%), *Polyplax spinulosa* (12.6%), *Myobia musculi* (1.4%), and *Eutrombicula bryanti* (49.6%); 4 species of nematodes: *Capillaria hepatica* (6.9%), *Graphidioides mazzai* (18.8%), *Trichuris gracilis* (3.5%), and *Paraspirudera uncinata* (37%); and a single trematode, *Fasciola hepatica* (4.2%), were identified.

The wild guinea pig, *Cavia aperea* Erxleben, 1777, is regarded as the ancestor to the domesticated guinea pig *C. porcellus* Linnaeus, 1758, which is widely used as a source of meat for local Andean communities (Mueller-Haye, 1984). The species belongs to the Caviidae (Order: Rodentia; Suborder: Hystricognathi), whose taxonomy remains a point of discussion. *Cavia aperea* occurs in Peru in the Sierra of the Andean Highlands and the Cordillera, stretching from the Departments of Cuzco and Ayacucho in the south to the Department of Cajamarca in the north. Although it has historically been an abundant species throughout its range, population densities have declined precipitously in recent years because of increased human activities. Few data exist concerning the parasites of the wild guinea pig. Macchiavello (1948) and Johnson (1957) reported some fleas (Siphonaptera) of *C. aperea*, i.e., *Tiamastus cavicola* Weyenberg, 1881 (Argentina, Bolivia, Peru, Chile) and *Hectopsylla suarezi* Fox, 1929 (Peru). Johnson (1957) and Hastriter and Peterson (1997) reported *Polygenis tripus* Jordan, 1933 from Argentina, *P. bohlsi jordani* Costa Lima, 1937, and *Adoratopsylla (Tritopsylla) intermedia intermedia* Wagner, 1901 from Brazil. Ferris (1951) and Johnson (1972) found the biting louse *Pterophytus immitans* Werneck, 1924 on *C. aperea* (type host) in Brazil, Argentina, Venezuela, and

Uruguay. Durden and Musser (1994) mention *P. alata* Ferris, 1921 from *C. aperea* in Argentina. Hopkins and Clay (1952) reported *Gliricola distinctus* Ewing, 1924, *G. lindolphi* Werneck, 1934, *G. braziliensis* Werneck, 1934, and *Trimenopon hispidum* Burmeister, 1838 from *C. aperea* in Brazil. There are no reports of Acari in wild guinea pigs in South America. Ramon Zaldivar (1991) found *Ornithonyssus bacoti* Hirst, 1913 on *C. porcellus* in Peru. Nematodes that were mentioned by Yamaguti (1961) included *Paraspirudera uncinata* (Porter, 1934) in *C. porcellus*, *C. aperea*, *Ctenomys* spp., and *Agouti paca* in South America; *Trichuris gracilis* Rudolphi, 1819 was mentioned from *C. aguti* (probably *A. paca*) in Brazil, *Capillaria hepatica* Travassos, 1915 from the genus *Cavia* in Brazil.

*Cavia aperea* individuals (143) were examined from 3 areas in Peru. Five species of endo- and 7 species of ectometazoan parasites were identified (Table I). Of these, 4 new host and 6 new locality records are reported.

The guinea pigs were trapped alive in the following areas: La Raya, 64 individuals; Lago Junin, 40 individuals; and El Paramo, 39 individuals. All areas are isolated from each other. La Raya is situated at an elevation of 4,000 m in the Sierra Alta of Department of Cuzco, near the village of Marangani; the Lago Junin (lake Junin) lies in the Department of Junin, at an elevation of 4,100 m; and El Paramo is an Andean paramo ecosystem situated in the Cordillera Blanca of the Department Cajamarca, at an elevation of 4,300 m. After encircling the guinea pigs by nets, they were then captured by hand. The ectoparasites were brushed off into plastic beakers and preserved in 70% ethanol; later they were transferred to 99.6% ethanol and stored at 4 C. All inner organs and cavities were examined for parasites. Stomach contents and small and large intestines were mixed with water and passed separately through a 100-mesh screen. Screenings were examined in a petri dish, using a magnifying glass (×10). Nematodes and the trematode were fixed in buffered formalin. Identification took place in the Parasitological Laboratories of the Veterinary Faculty of the University of Leipzig,

TABLE I. Prevalence (%) and mean intensity ( $\bar{x}$ ) of parasites of the wild guinea pig (*Cavia aperea*) from three localities in Peru.

	La Raya p*(%)/ $\bar{x}$	El Paramo p*(%)/ $\bar{x}$	Junin p*(%)/ $\bar{x}$	Location in host	Voucher nr.
<b>Siphonaptera</b>					
<i>Leptopsylla segnis</i> †	—	100/0–4	—	Fur	Lept/Jun1
<i>Tiamastus cavicola</i>	6.2/0–18	15.4/0–16	—	Fur	Tia/LR1
<b>Mallophaga</b>					
<i>Gliricola porcelli</i>	—	100/0–218	100/0–308	Fur	
<b>Anoplura</b>					
<i>Pterophtirus alata</i> †	15.6/0–16	—	—	Fur	Ptal/LR1-3
<i>Polyplax spinulosa</i> †‡	9.4/0–29	—	30/0–5	Fur	Posp/LR1-3
<b>Acari</b>					
<i>Eutrombicula bruyanti</i> †‡	92.2/0–36	—	30/0–41	Skin	Eutr/LR1-4
<i>Myobia musculi</i> ‡	—	—	5/0–4	Fur	Mym/EP1-5
<b>Nemata</b>					
<i>Graphidioides mazzai</i> †	28.1/0–7	—	22.5/0–8	Small intestine	
<i>Capillaria hepatica</i>	9.4/0–4	10.3/0–2	—	Liver	Cap/Caj1-5
<i>Paraspirodera uncinata</i>	39.1/0–4	28.2/0–7	42.5/0–6	Large intestine, cecum	
<i>Trichuris gracilis</i> †	—	7.7/0–9	5/0–4	Large intestine	Trg/Jun1
<b>Trematoda</b>					
<i>Fasciola hepatica</i> ‡	—	—	17.6/0–2	Liver	FH/Jun1-2

\* Prevalence.

† New locality record.

‡ New host record.

the Universidad de Cajamarca, and the Veterinary Faculty (UNMSM) in Lima. Techniques for dehydrating, clearing, mounting, and specification were used according to established standards. Voucher specimens of parasites and hosts have been placed at the Institute of Parasitology at the Veterinary Faculty, University of Leipzig, Germany (Table I). Specimens of *P. uncinata* and *Graphidioides mazzai* are deposited with the Facultad de Medicina Veterinaria of the UNMSM in Lima, Salamanca, Peru.

Siphonaptera (fleas) were represented by the genera *Leptopsylla* and *Rhopalopsyllus*. Species of the genus *Leptopsylla* normally occur in the Palaearctic and Ethiopian regions; one species, *Leptopsylla segnis* Schönherr, 1811, has been carried with its principal synanthrope host (*Mus musculus*) and is now cosmopolitan (Hopkins and Rothschild, 1971). In Peru, *L. segnis* has been reported from several ecological associates of *C. aperea* such as *Rattus* spp., *Akodon* spp., and *M. musculus* (Johnson, 1957), and on *C. porcellus* (Macchiavello, 1948). This is the first record of *L. segnis* on wild guinea pigs. The guinea pig flea *T. cavicola* is indigenous in South America (neotropical region). Its geographical range is apparently broad, occurring in Argentina, Peru, Chile, and Bolivia (Johnson, 1957). This flea has been reported from *Akodon* spp., *Kerodon* spp., *Ctenomys* spp., and *Oligoryzomys* spp. (Macchiavello, 1948; Hopkins and Rothschild, 1962; Johnson, 1957). *Tiamastus cavicola* has also been collected from 123 *C. porcellus* individuals examined in Moquegua, Peru (Valcarcel, 1999). The species occurred in the La Raya region on 4 (6.9%), and in the El Paramo region on 6 (15.4%) of the guinea pigs we collected.

The only species of chewing lice collected during this study was *G. porcelli*. Thirty-nine of the guinea pigs of the El Paramo region and 40 of the Lake Junin area were infested with this louse, showing a high infestation rate.

Johnson (1972), in her study of sucking lice (order: Anoplura), reports *Hoplopleura alata* (now *Pterophtirus*) on *Microcavia australis* (type host) in Argentina. Durden and Musser (1994) report it to be abundant on *C. aperea* in Argentina. *Pterophtirus alata* is the only representative of the genus *Pterophtirus* found on *C. aperea* in the Department of Cuzco, Peru, representing a new locality record. Another species of sucking lice on the wild guinea pigs was *Polyplax spinulosa*

Burmeister, 1839, which was recovered from 12.6% of all studied individuals. The species is cosmopolitan, mostly occurring on rodents. It has been reported from Venezuela and Brazil on *Rattus rattus*, *Proechimys semispinosus*, and *Oryzomys minutus* (Johnson, 1972; Yoshizawa, 1996). The occurrence on *C. aperea* in the La Raya and Junin populations represents a new host and locality record. A maximum of 29 specimens from a single individual from La Raya suggests that the wild guinea pig is a common host, although the intensity of infestation was much lower in Junin.

Acari were represented by the genera *Trombicula* and *Myobia*. Thor and Willmann (1947) list in their revision of the Trombiculidae *Eutrombicula bruyanti* Oudemans, 1910 from Brazil (type host: *Didelphys opossum*). The prevalence of the *E. bruyanti* larvae, found on the ears and around the eyes of the guinea pigs, was very high in the La Raya population (92.2%) and reached 30% in the Junin population. The presence of *E. bruyanti* on *C. aperea* in these 2 areas represents a new host and geographical record. The species *Myobia musculi* Schrank, 1781, which occurs throughout the world, is commonly found on *Rattus* spp. and *M. musculi* (Baker et al., 1956). The finding of *M. musculi* also represents a new host record, although the low infestation level suggests a rare ecological associate with *C. aperea*.

Nematodes of the genera *Graphidioides*, *Capillaria*, *Paraspirodera*, and *Trichuris* were found during this study. *Graphidioides mazzai* Lent and Freitas, 1935 occurred in *C. aperea* from the La Raya and Junin populations, a new host and locality record. Several species of the genus *Graphidioides* are reported from the small intestine of some caviids in Argentina and Brazil (Yamaguti, 1961); *G. mazzai* was mentioned from *C. porcellus* in Puno, Peru (Ramon Zaldivar, 1991) and *Galea leucob-lephara* in Argentina (Lent, 1935).

*Capillaria hepatica* Travassos, 1915 was reported from numerous mammalian hosts throughout the world, including several ecological associates of *Cavia* spp., such as *Sigmodon* spp., *Akodon* spp., and man (Turhan et al., 1999). Olortegui (1961) and Gonzales (1970) found this species in the liver of 11 *C. porcellus* and 1 *C. aperea* in Cajamarca, Peru. Only 10 of the guinea pigs (6.9%) examined in this study were infested with this parasite. These did not occur around lake Junin. The typical guinea pig heterakid nematode *P. uncinata* was found in all 3

studied areas. The species *P. uruguayana*, from *C. aperea* in Uruguay (Freitas, 1956), can be regarded as *P. uncinata*. In total, 37% of *C. aperea* examined in this study were infested with *P. uncinata*. Olortegui (1961) and Gonzales (1970) reported higher levels of infested guinea pigs from the Cajamarca area (58%) and 72% from the Department of Cuzco, respectively. The nematode *T. gracilis* occurred in the large intestine of 3.5% of the guinea pigs examined. It was not detected from the La Raya region, although Gonzales (1970) reported a 23% prevalence among *C. aperea* from this area.

A single species of trematode was collected, *Fasciola hepatica* Linnaeus, 1758. This parasite was introduced into South America with sheep. Because of increased herding, the parasite could establish in new ecological areas. Yamaguti (1961) lists several herbivorous host species, whereas Vilchez (1988) found a prevalence of 40.5% in domesticated guinea pigs (*C. porcellus*) from the Department of Cajamarca. No *F. hepatica* was found in the wild guinea pigs of this department (El Paramo), but the Junin population showed a 15.4% prevalence (Table I). The maximum of 2 specimens per infected liver corresponds with the findings of Vilchez (1988) in *C. porcellus*. In total, no cestodes have been found, although Gonzales (1970) lists *Monoecocestus* sp. (28%) from *C. aperea* of the Cuzco area. No parasites were noted in the corporal cavities of the guinea pigs that were examined.

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