

# *Cavia porcellus* (Rodentia: Caviidae) as host for *Ctenocephalides felis felis* (Siphonaptera: Pulicidae) in artificial infestation

*Cavia porcellus* (Rodentia: Caviidae) como hospedeiro de *Ctenocephalides felis felis* (Siphonaptera: Pulicidae) em infestação artificial

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## Abstract

The number of guinea pigs is increasing as pet and their domestication necessitates the study of their pathology and emerging diseases. This study aimed to evaluate guinea pigs' capacity to be infested by *Ctenocephalides felis felis* fleas, as it is a common parasite among pets that causes irritation, stress, and transmission of other pathogens. Seventeen guinea pigs were infested with *C. felis felis*. After 48 hours, the animals were combed, and the number of fleas was determined. Guinea pigs had a very low recovery (average of 5%), leading us to conclude that they are not good hosts for this species, despite some literature citing it as an accidental host if infested along with dogs or cats.

**Keywords:** flea, infestations, guinea pig.

## Resumo

Os porquinhos-da-índia como animal de estimação têm aumentado cada vez mais, e, sua domesticação trouxe a necessidade de estudos sobre suas patologias e doenças emergentes. Este estudo teve como objetivo avaliar a capacidade de infestação dos porquinhos-da-índia pela pulga *Ctenocephalides felis felis*, ectoparasita comum entre os animais domésticos que causa irritação, estresse e transmissão de outros patógenos. Dezesete animais foram infestados com *C. felis felis*. Após 48 horas, os animais foram penteados e o número de pulgas determinado. Os porquinhos-da-índia tiveram uma recuperação muito baixa (média de 5%), levando-nos a concluir que estes não são bons hospedeiros para essa espécie de pulga, apesar de algumas literaturas os citarem como hospedeiro acidental se conviverem juntamente com cães ou gatos infestados.

**Palavras-chave:** pulga, infestação, porquinho-da-índia.

Fleas (Insecta, Siphonaptera) are important vectors of pathogens in many parts of the world, and their infestation in pets and home environments is common, becoming a major nuisance pest responsible for producing and transmitting diseases in humans and pets. The main species discussed is the cat flea, *C. felis felis* (Dryden & Rust, 1994). The domestication of guinea pigs has exposed them to new pathogens when in contact with other animals. There are reports about rodents kept along with dogs or cats infested with *Ctenocephalides* spp. may also become infested with fleas (Cubas et al., 2014; Fehr & Koestlinger, 2013). Different treatments of guinea pigs have been tested for mites, lice, and fleas (Eshar & Bdolah-Abram, 2012; Kim et al., 2008; Nath, 2016; Vidal et al., 2006). They have also been used as experimental models to study allergic reactions to the bites of *C. felis felis* fleas (Benjamini et al., 1963). Therefore, to elucidate the interactions between fleas and guinea pigs, this study aimed to evaluate the infestation capacity of guinea pigs by cat fleas.




**How to cite:** Silva, T. X. A., Almeida, G. P. S., Borges, D. A., Rios, V. E. C., Correia, T. R. (2023). *Cavia porcellus* (Rodentia: Caviidae) as host for *Ctenocephalides felis felis* (Siphonaptera: Pulicidae) in artificial infestation. *Brazilian Journal of Veterinary Medicine*, 45, e003123. <https://doi.org/10.29374/2527-2179.bjvm003123>

**Received:** August 02, 2023.

**Accepted:** November 08, 2023.

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The study was performed according to protocol number 9459140519, submitted to and approved by the Ethics Committee on Animal Use (CEUA) of the Federal Rural University of Rio de Janeiro's (UFRRJ) Veterinary Institute (IV). The experiment was performed at the Laboratory of Experimental Chemotherapy in Veterinary Parasitology (LQEPV) of the Department of Animal Parasitology, IV of the UFRRJ, located in the city of Seropédica, Rio de Janeiro, Brazil. Eighteen male and female American Shorthair guinea pigs (*C. porcellus*) were separated into cages individually to investigate the susceptibility of each animal. Cat fleas (*C. felis felis*) were collected from a colony established and maintained in LQEPV and one hundred unfed adult fleas aged 7-14 days old was used to infest each animal. The flea colonies were maintained using a protocol approved by the CEUA of UFRRJ's IV (091/2014).

The animals were infested and 48 hours later, the fleas were combed out and counted per body area: head and back of the neck (HN), mentonian region (MR), tail (T), left side (LS), right side (RS), and abdomen (AB). This study was adapted from Marchiondo et al. (2013). One animal was excluded from the study due to suspected dermatophytosis. Table 1 shows the number of counted fleas per body region. A very low recovery (an average of 5%; 22% maximum and 0% minimum) was observed in all individuals. The highest prevalence was observed at the base of the tail, followed by the laterals.

**Table 1.** Recovery of *Ctenocephalides felis felis* fleas per body region on artificially infested guinea pigs.

Data	Recovery of fleas per body region on guinea pigs					
	HN	MR	Tail	Left side	Right side	Abdomen
Min-Máx	0-5*	0-1	0-6	0-5	0-4	0-3
Average	0.76	0.18	1.41	1.06	0.76	0.82

HN: Head and back of the neck; MR: Mentonian Region; \*In number of specimens.

In 2006, Vidal et al. described topical fipronil tested at different doses and times of action in naturally infested guinea pigs, however, the paper did not mention what flea species encountered. Benjamini et al. (1961) and Larrivee et al. (1964) have used guinea pigs as an experimental model to analyze skin reactions to flea bites. The cat fleas were not infested but placed unfed in a shaved area for a few minutes, and then removed, suggesting that these experiments were not conclusive in determining if guinea pigs are good hosts for the cat flea. There have been no other reports of flea infestations in guinea pigs.

The results of this experiment indicate that the artificial infestation of fleas in guinea pigs was inefficient. The data allowed us to deduce that guinea pigs are not good flea experimental models and possibly are not naturally susceptible to *C. felis felis* infestation.

## Ethics statement

The animals used in the experiment has been approved at the Animal Use Ethics Committee (CEUA) of the Veterinary Institute of the Federal Rural University of Rio de Janeiro with protocol number 9459140519.

## Financial support

The animals used in the experiment has been approved at the Animal Use Ethics Committee (CEUA) of the Veterinary Institute of the Federal Rural University of Rio de Janeiro with protocol number 9459140519.

## Conflict of interests

TXAS, GPSA, VECR, DAB and TRC - No conflict of interest

## Authors' contributions

TXAS - Preparation and execution of the experiment; writing the manuscript. GPSA and VECR - Execution. DAB - Preparation, Review and Editing manuscript. TRC - Development of methodology, Application of statistical study data, Review and Editing manuscript.

## Availability of complementary results

The work was carried out at Laboratório de Quimioterapia Experimental em Parasitologia Veterinária/Departamento de Parasitologia Animal (LQEPV/DPA), from Instituto de Veterinária (IV) of Universidade Federal Rural do Rio de Janeiro (UFRRJ), Seropédica, RJ, Brazil.

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