Ticks and fleas in crab-eating fox (*Cerdocyon thous*) of Pernambuco state, Brazil

Carrapatos e pulgas em cachorro-do-mato (Cerdocyon thous) do Estado de Pernambuco, Brasil

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Abstract

This study aimed to identify the species of fleas and ticks of *Cerdocyon thous* from the state of Pernambuco. Animals (n = 20) were examined, with 30% (6/20) ectoparasitized. Fleas (n = 16) and ticks (n = 17) parasitizing free-living crab-eating fox and captive in state of Pernambuco were collected. The fleas were identified as: *Pulex irritans* and *Ctenocephalides felis*; and the ticks were: *Rhipicephalus sanguineus* sensu lato and *Amblyomma ovale*. The presence of ectoparasites of domestic animals parasitizing *C. thous*, suggests a close contact of this species to the peridomicile. Furthermore, this is the first report of the occurrence of *A. ovale* in *C. thous* in northeastern Brazil.

Keywords: Flea. Tick. *Amblyomma ovale*. Crab-eating fox.

Resumo

Objetivou-se identificar as espécies de pulgas e carrapatos de *Cerdocyon thous* provenientes do estado Pernambuco. Foram examinados 20 animais, estando 30% (6/20) ectoparasitados. Foram coletadas 16 pulgas e 17 carrapatos em cachorros-do-mato de vida livre e de cativeiro no estado de Pernambuco. As pulgas foram identificadas como: *Pulex irritans* e *Ctenocephalides felis*; e os carrapatos foram: *Rhipicephalus sanguineus* sensu lato e *Amblyomma ovale*. A presença de ectoparasitos de animais domésticos parasitando *C. thous*, sugere a aproximação de indivíduos desta espécie ao peridomicílio. Além disso, este é o primeiro relato da ocorrência de *A. ovale* em *C. thous* no nordeste brasileiro.

Palavras-chave: Pulga. Carrapato. *Amblyomma ovale*. Cachorro-do-mato.

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Introduction

Studies on the ectoparasite fauna of wild animals are of great importance for understanding the cycle and the possibility of parasitism in animals used as pets and of production, as well as to aid conservation studies (RODRIGUES; DAEMON, 2004).

Some studies have reported infestations of wild canids, including *Cerdocyon thous* by arthropod species of Siphonaptera, Phtiraptera and Arachnida orders (CERQUEIRA et al., 2000; RODRIGUES; DAEMON, 2004).

Some species of ectoparasites, especially fleas and ticks, have been reported in *C. thous* in Brazil, specifically in the states of Bahia and Minas Gerais (CERQUEIRA et al., 2000; RODRIGUES; DAEMON, 2004).

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The synanthropic habits of some wild canids, the presence of domestic animals near conservation areas and the use of beds in the grounds of captivity carnivores play an important role in perpetuating parasite infestations on wildlife (CERQUEIRA et al., 2000; GOMES, 2006).

In Brazil, several species of wild canids have been reported as parasitized by ticks of species *Amblyomma* spp., *Dermacentor nitens*, *Rhipicephalus sanguineus* sensu lato (s. l.) and *Rhipicephalus microplus* (RODRIGUES; DAEMON, 2004; LABRUNA et al., 2005; CURI et al., 2010).

Flea infestation is also quite common in wild canids, causing serious behavior problems due to intense itching (GOMES, 2006). Studies conducted in Brazil have shown the occurrence of eight families, 20 genera and 59 species and/or subspecies of fleas distributed throughout most of the territory, the most common being Pulicidae and Rhopalopsyllidae families (LINARDI; GUIMARÃES, 2000).

The fleas *Ctenocephalides canis*, *Ctenocephalides felis, Pulex irritans, Rhopalopsyllus lutzi lutzi* and *Xenopsylla cheops* have been found parasitizing *C. thous* in northeastern Brazil (CERQUEIRA et al., 2000).

Although many species of ectoparasites are known to parasitize wildlife in the world, descriptions of ectoparasitism in wild canids in Brazil have been rare. In this context, the aim of this study was to identify the species of ixodidae and siphonaptera that are found in *C. thous* in the state of Pernambuco, Brazil.

Materials and Methods

To execute the study, all invasive procedures were performed with the approval of the Ethics Committee for Animal Use (CEUA) of the Federal Rural University of Pernambuco and the System of Authorization and Information on Biodiversity (SISBIO).

Twenty individuals of *C. thous* species were used. Of these, one animal was from captivity, from the metropolitan region of Recife; two animals were from the wild, captured in the municipality of Petrolina (09°23'S, 40°28'W); and six animals were from the Center for Conservation and Management of the Fauna of Petrolina, CEMAFAUNA-Petrolina (09°23'S and 40°30'W), which works with the rehabilitation and release of wild animals in Pernambuco's semi-arid region. The study also used eight animals from the Screening Center of Wild Animals of Recife (*Centro de Triagem de Animais Silvestres*-CETAS-Recife) (08°03'S and 34°52'W), which works with rehabilitation and release of wildlife in the metropolitan area of Recife; and three animals from the Dois Irmãos State Park of Recife (08°09'S and 34°52'W). Close to all areas included in the study there are human populations and domestic animals, both pets and/or of production.

Tomahawk traps, type *live trap,* which were laid out on the ground were used for the capture of wild animals. The traps were monitored daily from 5 a.m. for a two-week period. Chicken pieces were used to attract and capture animals. At the time of checking the traps, captured animals were physically restrained, using a dip net and leather gloves. Physical restraint was also performed for the captive animals.

Chemical restraint was carried out to minimize the stress of detention and to promote the absence of painful stimuli, as well as for staff safety. Drugs used were ketamine at a dose of 8 mg/kg and xylazine at a dose of 0.8 mg/kg (GOMES, 2006).

Clinical data, management and biometrics were recorded and the animals were marked with subcutaneous microchips. The animals were monitored by means of physiological parameters (heart rate, respiratory rate, temperature). After animal handling, the staff awaited full return from sedation for subsequent release.

The animals were examined carefully and the ectoparasites were collected manually and harvested in 70% ethanol for later identification. Considering that the collection of ectoparasites was carried out in a short period of time, only while the effect of the

anesthesia lasted, ectoparasites remained in the animals.

The identification of ectoparasites was conducted through magnifying glass at the Parasitology Laboratory of the Federal Rural University of Pernambuco, using the key of Linardi and Guimarães (2000) to identify the siphonaptera, and Barros-Battesti et al. (2006) to identify the ixodidae.

Results

Sixteen fleas and 17 ticks were collected from twenty *C. thous* in the state of Pernambuco, both from wildlife and from captivity.

Thirty percent (6/20) of the evaluated animals were ectoparasitized by ixodidae and/or siphonaptera. This low number reflects the fact that 80% (18/20) of the subjects were animals from captivity or rehabilitation centers. The regular usage of ectoparasiticides on the animals when they are introduced into the ground enclosures is a common management practice of the veterinarians responsible for carnivores of investigated places.

In the two wild animals from the municipality of Petrolina, 11 specimens of fleas of the *P. irritans* species and one tick of the *R. sanguineus* s. l. species were found; while in four animals from CETAS-Recife, five fleas of the *C. felis* species were found, as well as seven ticks of the *R. sanguineus* s. l. species, two ticks of the *Amblyomma ovale* species and seven larvae of *Amblyomma* sp.

The flea species that was most frequent was *C. felis*, belonging to the Pulicidae family, present in 66.7% (4/6) of parasiticized animals.

Regarding ectoparasitism by ticks, *R. sanguineus* s. l. was present in three of six individuals, while only one of six were parasiticized by adult forms of *A. ovale* and by six larvae of *Amblyomma* sp.

Discussion

According to Linardi and Guimarães (2000), the fleas of the Pulicidae and Rhopalopsyllidae families are the most commonly found parasitizing carnivores in Brazil.

Although less frequent, Cerqueira et al. (2000) and Curi et al. (2010) also found fleas of the *P. irritans* and *C. felis* species parasitizing *C. thous*, which characterizes an eco-epidemiological connection of the *C. thous* with the domestic environment (CERQUEIRA et al., 2000), since, according to Koutinas et al. (1995), the distribution of *C. felis* is related to environmental factors that influence the survival, development and reproduction of this species.

Hopkins et al. (1953) agree that, although primarily a sort of flea species that is found in felines, *C. felis* is more adaptable than *C. canis*, as it infests a larger number of species dispersed over larger areas.

A higher frequency of *C. felis* parasitizing *C. thous* was also reported by Rodrigues and Daemon (2004), who identified *C. felis* in crab-eating fox in the state of Minas Gerais, as well as fleas of the *R. lutzi* species, this later species not being found in the present study.

These results also differ from those found by Cerqueira et al. (2000), who demonstrated that *R. lutzi* was the flea species that was most frequent in *C. thous* in the state of Bahia. The Rhopalopsyllidae family is considered important because of its wide geographical distribution, number of taxa and endemic character of several species (LINARDI; GUIMARÃES, 2000) such as marsupials (BARROS-BATTESI; ARZUA, 1997), rodents (LINARDI, 1985) and carnivores (LINARDI, 1985; CERQUEIRA et al., 2000).

On the other hand, *C. thous* individuals were also infested with *R. sanguineus* s. l. ticks which are primarily adapted to domestic canines. Similar results were also reported by Szabó et al. (2001) who stated that wild mammals living near households may be infested with *R. sanguineus* s. l., since the fragmentation of the forest allows a displacements of *C. thous* of up to 12.8 Km^2 in certain Brazilian regions (JUAREZ; MARINHO-FILHO, 2002).

The occurrence of seven larvae of *Amblyomma* sp. found in one of the animals from CETAS-Recife,

demonstrated that parasitism can occur through this stage of ixodidae ticks, as shown by Rodrigues and Daemon (2004) who reported the presence of nymphs in *C. thous* in the state of Minas Gerais.

The presence of parasitism by *A. ovale* in a *C. thous* from the CETAS-Recife is similar to the findings by Labruna et al. (2002) and Rodrigues and Daemon (2004), who also reported the presence of *Amblyomma* ticks in crab-eating fox in southeastern Brazil. These authors found nymphs of *Amblyomma cajennese* s. l. and adult parasites of *Amblyomma aureolatum* and *A. ovale*, respectively. Thus, this is the first report of parasitism by *A. ovale* in *C. thous* in northeastern Brazil.

The fragmentation of natural ecotopes allows ectoparasites that are primarily adapted to domestic carnivores (*C. felis* and *R. sanguineus* s. l.) to be well disseminated in the wild. In addition, tick species like *A. ovale* are adapted to wild carnivores such as *C. thous*.

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