

## Dermatitis prompted by a collar employed in radio-telemetry monitoring

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### Abstract

Technological advances, such as radio-telemetry, have been increasingly employed for animal monitoring because they can furnish important information regarding the ecology and behaviour of various species. However, during a study on semi-domiciled domestic cats (*Felis silvestris catus*) conducted in an environmental protection area in Ilha Comprida, state of São Paulo, Brazil, we identified a case of dermatitis that was caused by a radio-collar, which was first noticed by the pet owner. This provided the opportunity for close observation not normally possible when these are used to track animals in the wild. It is our aim to bring the possibility that skin inflammation may develop when using radio-collars in radio-telemetry monitoring to the attention of other researchers. This finding highlights the need for greater attention to be paid to the use of this methodology, especially in the realm of wild animals.

**Keywords:** animal welfare, Atlantic Forest, dermatitis, *Felis silvestris catus*, radio-collar, telemetry

### Dermatitis prompted by radio-collar

Radio-telemetry can provide relevant information regarding the behaviour of twilight or nocturnal mammalian carnivores. This technique is advantageous because it does not rely on direct visibility of the observed animal (Liberg & Sandell 1988). As a result, there have been great advances in the field of radio-telemetry, with it being increasingly utilised for the observation of animal behaviour. It has been successfully employed in the monitoring of a wide variety of species and habitats, and is sometimes the only way of obtaining data on certain species (Crawshaw 1997).

The domestic cat (*Felis silvestris catus*) has accompanied human beings throughout all the exploration and colonisation phases of humankind; thus, they have been introduced into most terrestrial ecosystems either unintentionally or deliberately (Fitzgerald & Karl 1979). These animals have adapted successfully to various environments (Apps 1983), becoming dominant predators, particularly in insular locations (Nogales *et al* 1992; Nogales & Medina 1996; Barratt 1997; Bonnaud *et al* 2007; Medina & Garcia 2007) as well as in rural and urban areas (Pearre & Maass 1998; Weber & Dailly 1998; Woods *et al* 2003). Unfortunately, cats can act as potential transmitters of zoonoses to native species (Ogan & Jurek 1997), mainly to other felines (Jessup *et al* 1993; Roelke *et al* 1993; Lucherini *et al* 2008). Moreover, domestic cats can directly or indirectly influence the population growth of wild feline species which, in some

cases, can endanger their conservation status (Biró *et al* 2004) as well as that of their prey.

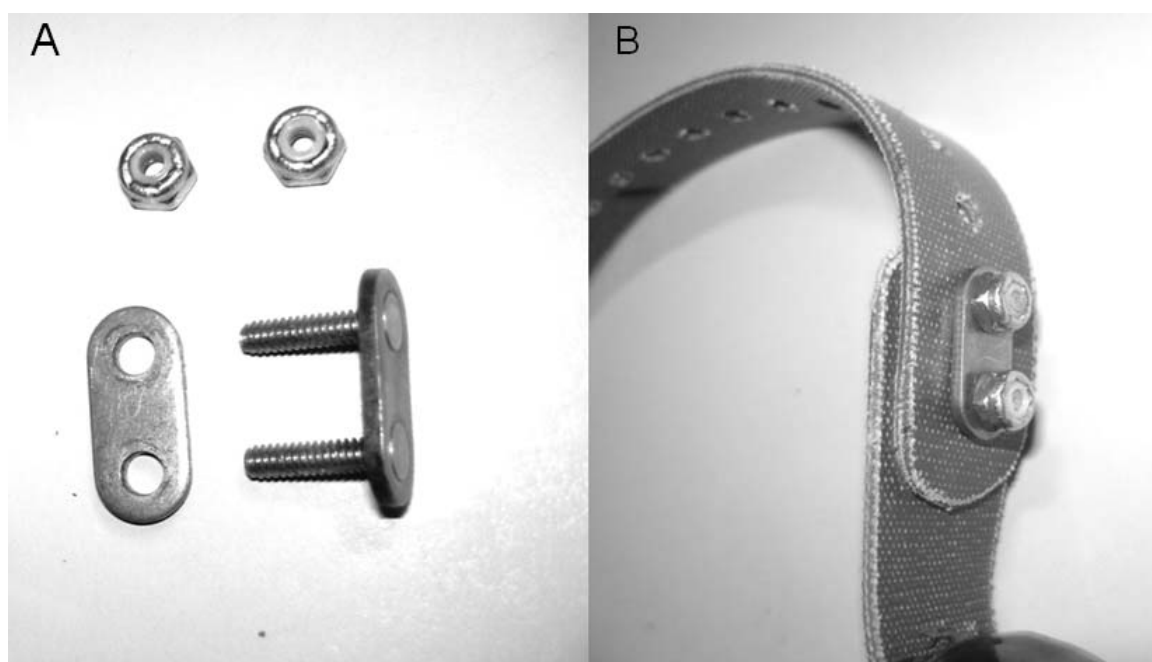
There is a lack of information regarding the behaviour of animals inhabiting natural habitats in Brazil and their subsequent impact on fauna. Thus, we conducted a study between September 2009 and September 2010 that aimed to gain an understanding of diet and area usage (living area) of a group of ten semi-domiciled cats (ie cats that live mostly outdoors but which rely upon humans for food and shelter) belonging to residents of Ilha Comprida, State of São Paulo, Brazil (24°52'S, 47°57'W) (cf Ferreira 2011).

This work was approved by the Animal Research Ethics Committee of the Federal University of Juiz de Fora, Minas Gerais, Brazil (protocol n 024/2009, CEEA). Consent was also obtained from the pet owners.

Firstly, each animal was identified. Then, each cat received a radio-collar. The collar consisted of a piece of cloth impregnated with neoprene (a synthetic polychloroprene elastomer) and a flexible aerial. The tracking device was connected electronically and a feeding battery was coated with an impermeable resin. The collar was fastened onto the animal's neck with stainless screws and nuts through two brass (copper/zinc alloy) end-plates (see Figure 1).

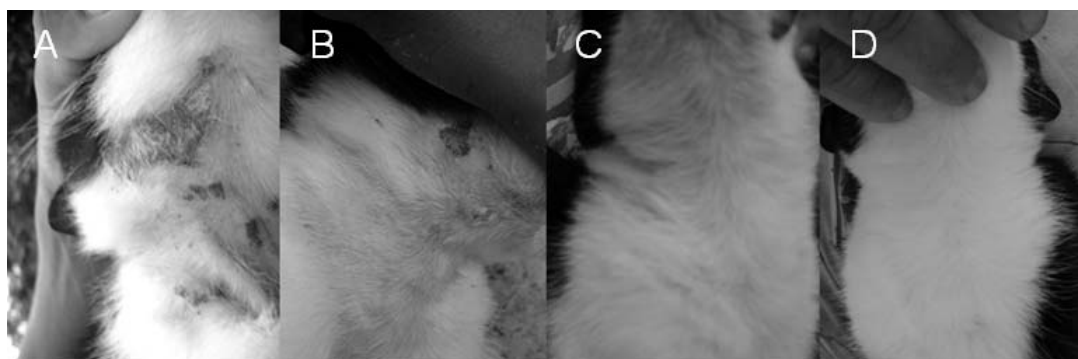
Sixteen days following collar fixation, one of the animals presented with fur loss, reddening, and lesions caused by an itch-induced eruption of blisters in the cervical region

Figure 1



Photographic images of (A) the metal segment employed for fixation of the radio-telemetry collar and (B) the collar closed with this metal segment.

Figure 2



Photographic images of (A) the macroscopic aspect of the lesion, prompted by dermatitis in domestic cats, and evolution at (B) 15 days, (C) 30 days, and (D) 75 days.

(Figure 2A). A veterinarian diagnosed the animal with skin inflammation (dermatitis). The collar was removed, and lesions treated with steroidal anti-inflammatories (Betamethasone valerate, Gentamicin sulfate, Tolnaftate, and Clioquinol, Quadri-derm, Mantecorp, Brazil), after local asepsis with bactericidal soap (Trichlorocarbane TCC, Protex, Colgate-Palmolive, Brazil). The animal was treated daily for three months, and the progress was monitored via macroscopic evaluation of the lesion every 15 days. Images were compared and the animal's recovery assessed (Figure 2A, B, C, D).

Treatment was effective (see Figure 2). There was gradual but significant healing and total recovery of the lesion was

observed after 75 days. The animal was withdrawn from the radio-telemetry study group since the dermatitis was attributed to the use of the radio-collar.

A potential cause could have been allergy to metallic components of the collar. Allergic contact hypersensitivity occurs due to the release of ions that bind to proteins in the dermis during corrosion of the alloy (Grimsdottir *et al* 1992). This allergic contact dermatitis develops only when these molecules are able to penetrate the skin and bind the cell surface proteins of the epidermis and dermis, inducing a delayed immune reaction mediated by cells involved in the delayed hypersensitivity, mainly T lymphocytes (Marks & Deleo 1992; Carvalho 1995; Rycroft *et al* 2001).

The condition we describe has been observed previously, not only for this method of marking but also in others with other taxa (see Murray & Fuller 2000); however, we hope that this detailed report, based on close observation of a single individual, will further substantiate worries regarding possible reactions concerning animals under scrutiny, in particular where endangered species are the focus of attention. We suggest the manufacturers of radio-telemetry equipment strive to improve the safety of their products, including the use of hypersensitivity tests. Also, closer monitoring of species should be implemented, wherever possible, especially in the first days following fixation of tracking devices, to monitor the health status, well-being, and preservation of the target species.

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