

First record of *Leporacarus gibbus* infestation in domestic rabbits (*Oryctolagus cuniculus*) in southern Rio Grande do Sul state, Brazil

Primeiro registro de infestação por *Leporacarus gibbus* em coelhos domésticos (*Oryctolagus cuniculus*) no sul do Rio Grande do Sul, Brasil

Natália Soares Martins^{1*}, Júlia Somavilla Lignon¹, Diego Moscarelli Pinto¹,
Marcos Roberto Alves Ferreira¹, Raíssa Gasparetto², Felipe Geraldo Pappen¹

ABSTRACT: *Leporacarus gibbus* is an ectoparasite of rabbits, in which infestation is usually subclinical and can, sometimes, be underdiagnosed. This case report presents a symptomatic infestation by *L. gibbus* in rabbits, for the first time, at southern Rio Grande do Sul, Brazil. Forty-four rabbits from a vivarium in the city of Capão do Leão, Rio Grande do Sul State, Brazil, were evaluated. Dermatitis and alopecia were observed on the hind legs, neck, and back of the animals. External inspection revealed the presence of ectoparasites. Skin scraping, adhesive tape impression, and hair plucking were performed for diagnosis. However, only after stereomicroscopic examination of the coat, the presence of mites was revealed. The specimens were clarified in phenol/xylene and mounted in a non-permanent preparation. After light microscopic evaluation, the specimens were taxonomically classified as *L. gibbus*. Ivermectin treatment was applied, with 100% efficacy after 7 days. This report describes, for the first time, a case of *L. gibbus* infestation in domestic rabbits in the region, with dermatological manifestation.

KEYWORDS: Mite; rabbit; ectoparasites, dermatitis.

RESUMO: *Leporacarus gibbus* é um ectoparasito de coelhos, cuja infestação é geralmente subclínica e pode, por vezes, ser subdiagnosticada. Este relato de caso apresenta uma infestação sintomática por *L. gibbus* em coelhos, pela primeira vez, no sul do Rio Grande do Sul, Brasil. Foram avaliados 44 coelhos provenientes de um biotério da cidade de Capão do Leão, Rio Grande do Sul, Brasil. Foram observadas dermatite e alopecia nas patas traseiras, pescoço e dorso dos animais. A inspeção externa revelou a presença de ectoparasitos. Raspados de pele, impressão com fita adesiva e remoção de pelos foram realizadas para diagnóstico. Porém, somente após a observação da pelagem em estereomicroscópio, foi revelada a presença de ácaros. Os espécimes foram clarificados em fenol/xileno e montados em preparo não-permanente. Após avaliação microscópica de luz, os espécimes foram classificados taxonomicamente como *L. gibbus*. Foi aplicado tratamento com ivermectina, com 100% de eficácia após 7 dias. Este relato descreve, pela primeira vez, um caso de infestação por *L. gibbus* em coelhos domésticos na região, com manifestação dermatológica.

PALAVRAS-CHAVE: Ácaro; coelho; ectoparasitos, dermatite.

INTRODUCTION

Oryctolagus cuniculus, commonly known as domestic rabbit, is an animal species widely used for biomedical research purposes as an animal model for a better understanding of disease mechanisms, testing new treatments and vaccines (Bösze; Houdebine, 2006). Animal research plays a vital role in most advances related to human and animal health. The use of

rabbits for biological experimentation includes, in laboratory research, studies of physiology, microbiology, nutrition, and toxicity for testing new medicines; in clinical laboratories, studies on hormones and the production of vaccines and serums are performed (De Almeida; Leite, 2012).

The high fertility and rapid growth rate of rabbits, combined with their calm temper, favor their production for

¹ Universidade Federal de Pelotas, Pelotas/RS, Brasil

² Universidade Federal do Rio Grande do Sul, Porto Alegre/RS, Brasil

*Corresponding author: nataliamartins.mv@gmail.com

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commercial purposes (Varga, 2014). Cuniculture is considered an economically important activity to produce meat, fur, and leather (Fernandes *et al.*, 2013). On the pet market, rabbits are sold as companion animals as they are docile, visually pleasant, and easy to care for (Melo *et al.*, 2008).

Among the main diseases that can compromise rabbit farming, ectoparasite infestations are common problems that cause skin diseases. *Leporacarus gibbus* (formerly known as *Listrophorus gibbus*) is a common mite of rabbits and belongs to the order Sarcoptiformes, suborder Astigmata, parvorder Psoroptida, and family Listrophoridae (Schoch *et al.*, 2020). This ectoparasite feeds on skin epithelial cells and sebum and spends its entire life cycle on the rabbit coat (Dumitrache *et al.*, 2021). Due to the absence of clinical signs in some healthy animals, *L. gibbus* was considered as commensal (Kirwan; Middleton; McGarry, 1998); however, in cases of heavy infestations, high stocking density, and immunosuppression, clinical signs can manifest in the form of alopecia, pruritus, and pyotraumatic dermatitis (Serra-Freire; Benigno; Falcão, 2010; D'Ovidio; Santoro, 2014).

Leporacarus gibbus is a highly specific acarian parasitizing rabbits; although it is considered uncommon in humans, case reports indicate its zoonotic potential (D'Ovidio; Santoro, 2014). Even though it is considered a cosmopolitan species for wild and domestic rabbits, there is a lack of diagnostic reports and epidemiological studies on its occurrence (Dumitrache *et al.*, 2021). The present report describes an *L. gibbus* infestation in rabbits in southern Rio Grande do Sul, Brazil. To the authors' knowledge, this is the first report of *L. gibbus* in the study region.

CASE REPORT

In October 2022, 44 New Zealand breed rabbits of both sexes were evaluated in a vivarium of the Universidade Federal de Pelotas (UFPEL), located in the city of Capão do Leão, Rio Grande do Sul (RS) State, Brazil. The animals were being used as models for biological experimentation. All procedures performed were approved by the Ethics Commission on Animal Use of the UFPEL under protocol number 028470/2022-18. During the study, we observed dermatitis and alopecia on the neck, hindlegs, and dorsum of the animals. Upon external inspection, the presence of ectoparasites was noted (Fig. 1). Skin scrapings, adhesive tape impressions, and hair plucks were requested for diagnosis.

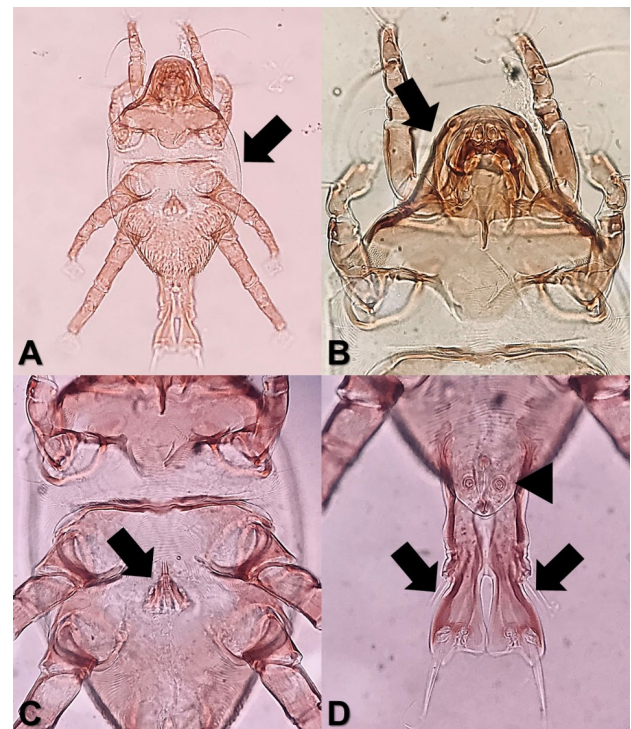
Both skin scrapings and adhesive tape impressions were negative. However, several mites were observed in the fur via stereomicroscopic examination. Ectoparasites were removed from the hair and kept in 70% alcohol until identification. For this purpose, they were clarified in phenol/xylene according to the method of Costa Lima (Hoffmann, 1987) and mounted in a non-permanent preparation between the slide and the coverslip. The specimens were examined under a light microscope (10x and 40x objectives) and taxonomically classified according to Kirwan; Middleton; McGarry (1998).

Mites of both sexes were analyzed. They showed sub-cylindrical bodies, laterally flattened, with a thin and striated cuticle, strongly sclerotized gnathosoma, giving a dark hooded appearance, and short legs, without adaptations for attachment to the animal hair. These characteristics are morphologically compatible with those of the species *L. gibbus* (Figs. 2 and 3). No other ectoparasite species were visualized.



Source: author's collection

Figure 1. Ectoparasites observed during external inspection on the back of rabbits raised in a vivarium in the south of the state of Rio Grande do Sul, Brazil.



Source: author's collection

Figure 2. *Leporacarus gibbus* male. A – Ventral view of the mite body, with thin and striated cuticle (arrow); B – Anterior region of the mite, with the gnathosoma strongly sclerotized (arrow); C – Male copulatory organ (arrow); D – Elongated adanal processes (arrow) and adanal suckers (arrowhead).



Source: author's collection

Figure 3. Female *Leporacarus gibbus* parasite of rabbit. A – Side view; B – Ventral view.

DISCUSSION

In Rio Grande do Sul, the presence of *L. gibbus* has only been reported in the central region of the state, more specifically, in the city of Santa Maria/RS by Silva *et al.* (2006). This was also the first report in Brazil; however, more than 15 years have passed, and to date, our report is the first demonstrating the presence of this ectoparasite in southern RS.

In this study, skin scrapings and adhesive tape impressions did not allow us to detect the mites, and the suspicion of ectoparasitism arose only when some animals began to show signs of dermatitis. Dermatological disorders caused by ectoparasites are common in laboratory and pet rabbits. However, the diagnosis of some infestations can be challenging due to the difficulties in parasite detection by routine diagnostic techniques. In *L. gibbus* infestations, given the mite location in the

distal third of the hair shaft, ectoparasite visualization can be underestimated, especially in dark-haired rabbits (D'Ovidio; Santoro, 2014). In addition, healthy animals appear to tolerate the infestation and may not show clinical signs (Oliveira; Alves; Bezerra, 2011).

The occurrence of clinical cases of *L. gibbus* has been associated with the presence of *Cheyletiella parasitovorax* and/or *Psoroptes* spp. (Batista *et al.*, 2013; Gorza *et al.*, 2018; Kim *et al.*, 2008). In contrast, single infestations by *L. gibbus* in Brazil (Oliveira; Alves; Bezerra, 2011; Serra-Freire; Benigno; Falcão, 2010; Silva *et al.*, 2006) and worldwide (D'Ovidio; Santoro, 2014; Deak; Turcu, 2020) have already been described. These various reports indicate that the parasite can be the primary cause of dermatitis, without concomitant infection with other mites. This is in agreement with the findings of the present study.

Several antiparasitic drugs can be used in the treatment of mite infestation, such as amitraz, organophosphates, avermectins, and pyrethroids. In this study, the infested rabbits were treated with ivermectin in a single dose of 300 mg/kg, subcutaneously. The animals were reevaluated 7 days after the treatment, and no mites were observed; the dermatitis symptoms had regressed. In addition to rabbits, other hosts can be affected by *L. gibbus*, making it essential to control this mite to avoid new infestations.

Dermatitis in humans (Burns, 1987; D'Ovidio; Santoro, 2014) and cats (Dumitrache *et al.*, 2021), associated with *L. gibbus*, has been reported. Consequently, humans and other animals could be exposed to these mites from newly adopted rabbits (Kim *et al.*, 2008). This study serves as an alert to veterinarians, physicians, researchers, and breeders regarding the occurrence of *L. gibbus* in this region. Further epidemiological studies are encouraged to diagnose this species and develop effective control strategies.

CONCLUSION

The present paper reports a case of massive and clinical infestation with *L. gibbus* in rabbits in the southern region of Rio Grande do Sul, Brazil. Infestation control and regression of dermatitis symptoms were possible with the use of ivermectin in a single dose. This is the first report of a case of infestation by *L. gibbus* in the study region, with dermatological manifestations.

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