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Cutaneous myiasis by *Cuterebra* spp. in an antelope hare (*Lepus alleni*) from Hermosillo, Sonora, Mexico

Miasis cutánea por *Cuterebra* spp. en una liebre antílope (*Lepus alleni*) de Hermosillo, Sonora, México

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ABSTRACT

This work aimed to report the first case of *Cuterebra* spp. in an antelope hare in Hermosillo, Sonora, Mexico. A morphological analysis of larvae was carried out, where the tissue densely covered with squamiform spines and spicules with twisting labyrinths was associated with *Cuterebra* spp. Microscopic lesions showed granulation tissues, dermoid cysts and spicules, and fibrous connective tissue delimiting the parasite, where the structures observed are the cuticle and spicules of the parasite, causing a mononuclear inflammatory reaction at the subcutaneous level. Although this genus is widely distributed in the country, there is no documented information on this myiasis in Sonora. The host was found close to an urbanization area, representing a risk to the human population.

Keywords: *Cuterebra* spp., Sonora, antelope hare, myiasis

RESUMEN

El objetivo de este trabajo fue describir el primer caso de *Cuterebra* spp. en una liebre antílope en el municipio de Hermosillo, Sonora, México. Se realizó un análisis morfológico de las larvas en donde se encontró tejido densamente cubierto de espinas escuamiformes y espículas con serpentinas a modo de laberinto, lo que se asoció a *Cuterebra* spp. En las lesiones microscópicas se observa tejido de granulación, quistes dermoides y tejido conectivo fibroso delimitando a la larva donde las estructuras que se observan son la cutícula y las espículas del parásito causando una reacción inflamatoria mononuclear a nivel subcutáneo. Aunque este género se encuentra ampliamente distribuido en el país, no existe información documentada de esta miasis en Sonora, además de que el hospedador se encontró en un lugar muy cercano a la urbanización y pudiera representar un riesgo a la población humana.

Palabras clave: *Cuterebra* spp., Sonora, liebre antílope, miasis



INTRODUCTION

Myiasis consists of an infestation of living vertebrates (humans, rabbits, squirrels, chipmunks, mice, cats, dogs and marsupials) by dipteran larvae (Zúñiga, 2009). These larvae can feed on live or dead host tissue, causing a wide range of lesions depending on the area affected (Francesconi & Lupi 2012). Flies lay their eggs in rabbit transit areas and near rodent burrows. The first instar larvae hatch instantly and crawl immediately to the host skin. These larvae enter the host through its natural body orifices, usually found in the cervical subcutaneous connective tissue, nasal and oral regions, and can even migrate to the brain and can cause death (Bowman, 2011). In rodents, areas most prone to infection are the neck, subscapular area, lower abdomen and hind limbs (Bermúdez *et al.*, 2010). Accidental infestation has also been documented in a coyote (*Canis latrans*), which presented a clinical history of bloody diarrhea due to gastric pseudomyiasis, indicating that this myiasis can be a pathological problem for rabbit predatory animals (Lara *et al.*, 2017). There are also case reports of involvement in humans, even causing tracheopulmonary myiasis by a third instar larva (Cornet *et al.*, 2003), as well as ocular myiasis (Grzyb *et al.*, 2011).

There are reports of this myiasis in Mexico, being more frequent in the central and southern part of the country (Azkarate *et al.*, 2012; Lara *et al.*, 2017). However, in Sonora State and specifically in arid zones of the country, there are no previous reports of *Cuterebra* spp. myiasis in vertebrate animals.

Although it has not been given due importance, the prevalence of myiasis caused by *Cuterebra* spp. can be very high in wild mammals (Cruz *et al.*, 2009; Bermúdez *et al.*, 2010), and may at some point infest domestic animals and humans.

DESCRIPTION OF THE CLINICAL CASE

This paper documents the first finding of a case of cutaneous myiasis by *Cuterebra* spp. in an antelope hare (*Lepus alleni*: Best & Henry, 1993), in Hermosillo municipality, Sonora, Mexico. This species of hare inhabits the southwestern states of the United States (Arizona and California) and northwestern Mexico, from Sonora, Sinaloa and Nayarit, as well as the Gulf of California. In this study, the hare was found dead from roadkill on the Hermosillo-Bahía Kino highway, kilometer 21 and Santa Lucía Boulevard (latitude 29.026194; longitude -111.144684) (Figure 1). Four fly larvae of the family Oestridae were found causing skin lacerations (Figure 2A). In addition, two dystrophic calcifications measuring 30 mm long by 25 mm wide were found, caused by the parasite (Figure 2B). The parasites were preserved in 10% formalin and are deposited in the Veterinary Anatomopathology collection of the Department of Agriculture and Livestock from the University of Sonora under number N-05-2020, and they were analyzed in the Pathology Laboratory of the same institution. In addition, photographs were taken with



the aid of a stereoscopic loupe (Motic ECO-T30), with 20x magnification, which helped us to distinguish the taxonomic characteristics of this larva, which were determined following the work of Pape (2001). In specimens analyzed, the tegument was densely covered with robust squamiform spines, as well as posterior spicules with three pairs of labyrinth-like serpentines, measuring 40 mm long by 15 mm wide, which allowed us to determine that the specimens belong to *Cuterebra* spp. (Figures 2C and 2D).

Histological sections of the area affected by *Cuterebra* spp. larvae were made, and the damage to the skin tissue in one of the lesions (left gluteal region) was verified and analyzed under an optical microscope (VELAB VE-20). Thickening was observed at the level of the dermis and hypodermis, with the presence of edema and areas of necrosis delimited by fibrous connective tissue (Figure 3A). A layer of abundant fibrous connective tissue can be distinguished delimiting parasitic remains (Figure 3B); zone of necrosis associated with parasitic destruction delimited by fibrous connective tissue (Figure 3C). Specifically, the lesion caused by the parasite shows an inflammatory reaction zone, composed mainly of neutrophils, with few lymphocytes and macrophages intermingled with areas of necrosis caused by the parasite spicules which were embedded in fibrous connective tissue at the level of the dermis (Figure 3D).

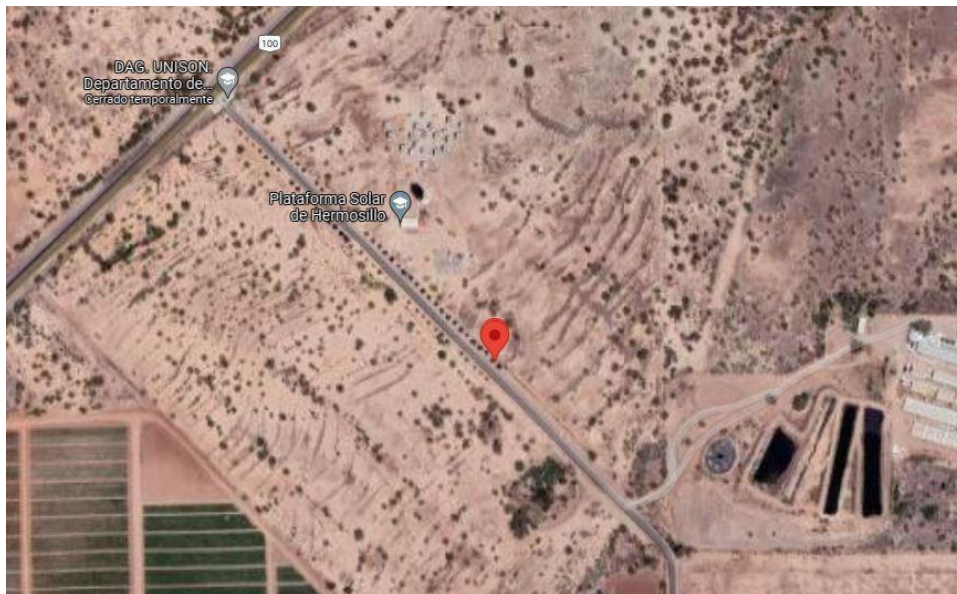


Figure 1. Geographic location of the antelope hare (*Lepus alleni*) discovery infested with *Cuterebra* spp. in Hermosillo, Sonora (Mexico), latitude 29.026194; longitude -111.144684

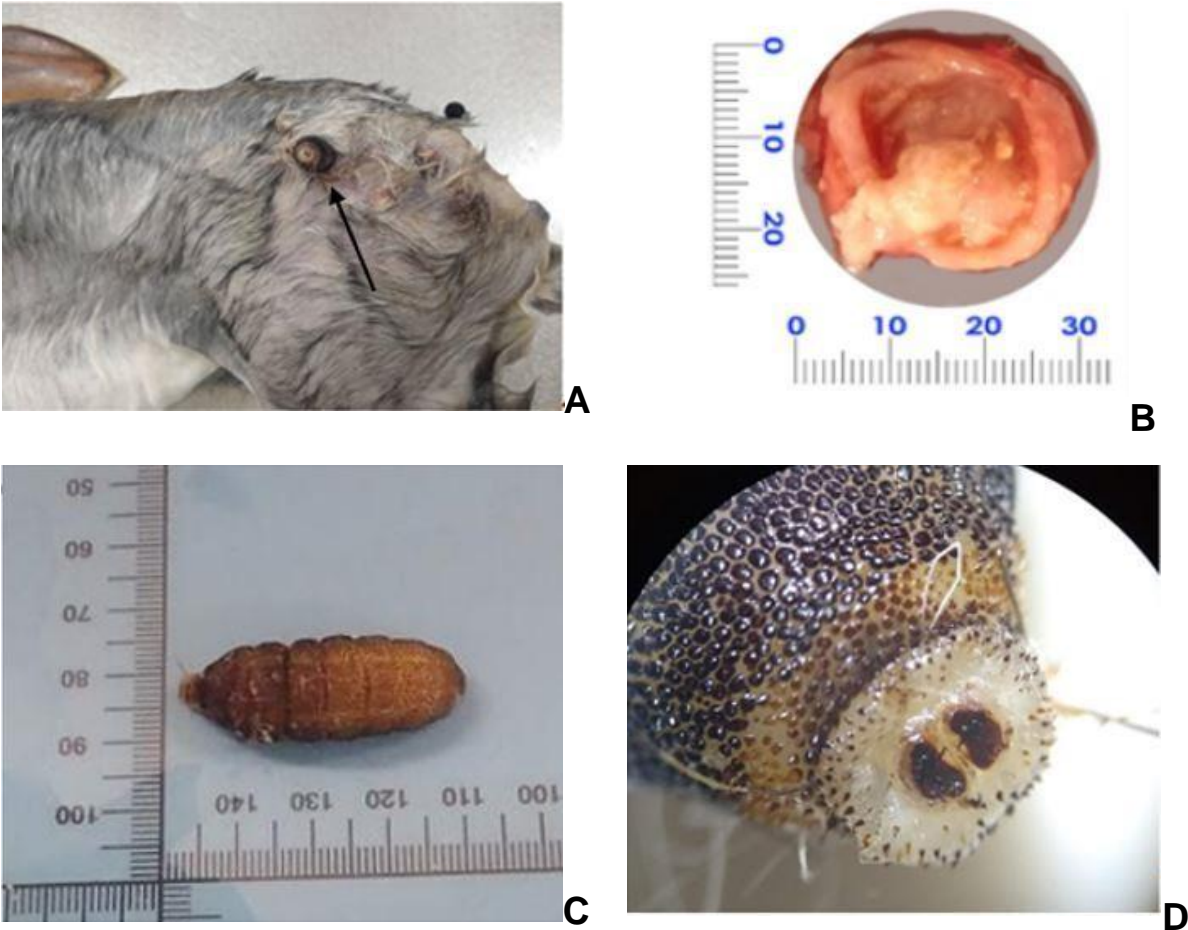


Figure 2. Representative photographs of the cutaneous lesion and parasite found in the hare. Stage II larva present in the left gluteal region crossing the layers of the integumentary tissue (A); dystrophic calcification caused by parasitic damage (B); third larval stage of *Cuterebra* spp. (C); Ventral view of the anterior end of the larva, where segments of the crown of spines can be seen, as well as its buccal hooks and the pseudocephalon (D)

DISCUSSION

Although the genus *Cuterebra* spp. is known to be widely distributed in Mexico and in the western hemisphere, however, there are no publications of this myiasis in Sonora State. The record of a host for *Cuterebra* spp. and the geographic location where this parasitosis was located, close to populated regions, suggest the possibility of dissemination to hosts such as companion animals, production animals or even humans. Humans are incidental hosts of this myiasis and it is most frequently found in children (Grzyb *et al.*, 2011). The main pathologies associated with these parasites are dermatological, such as furuncular myiasis in tissue near the eyebrow in a 55-year-old man, who presented erythema and swelling due to a stage III larva (Helm *et al.*, 2010). There have even been reports of tracheopulmar myiasis in humans caused by stage III larvae (Cornet *et al.*, 2003), so this parasitosis can become a public health problem.



Myiasis has also been reported in companion animals under 3 years of age, such as cats, in which it mainly causes external ophthalmomyiasis, and the affectations occur in summer (Schlesener *et al.*, 2021). It has also occurred in wildlife as in the case of a coyote which presented bloody diarrhea due to gastric pseudomyiasis (Lara *et al.*, 2017), and in wild rodent populations, where skin problems are mainly present (Bermúdez *et al.*, 2010). Both domestic and wild animals can present problems with this type of parasites if they have contact with hares, which are the usual hosts of *Cuterebra* spp. and the possibility of affecting humans is not ruled out.

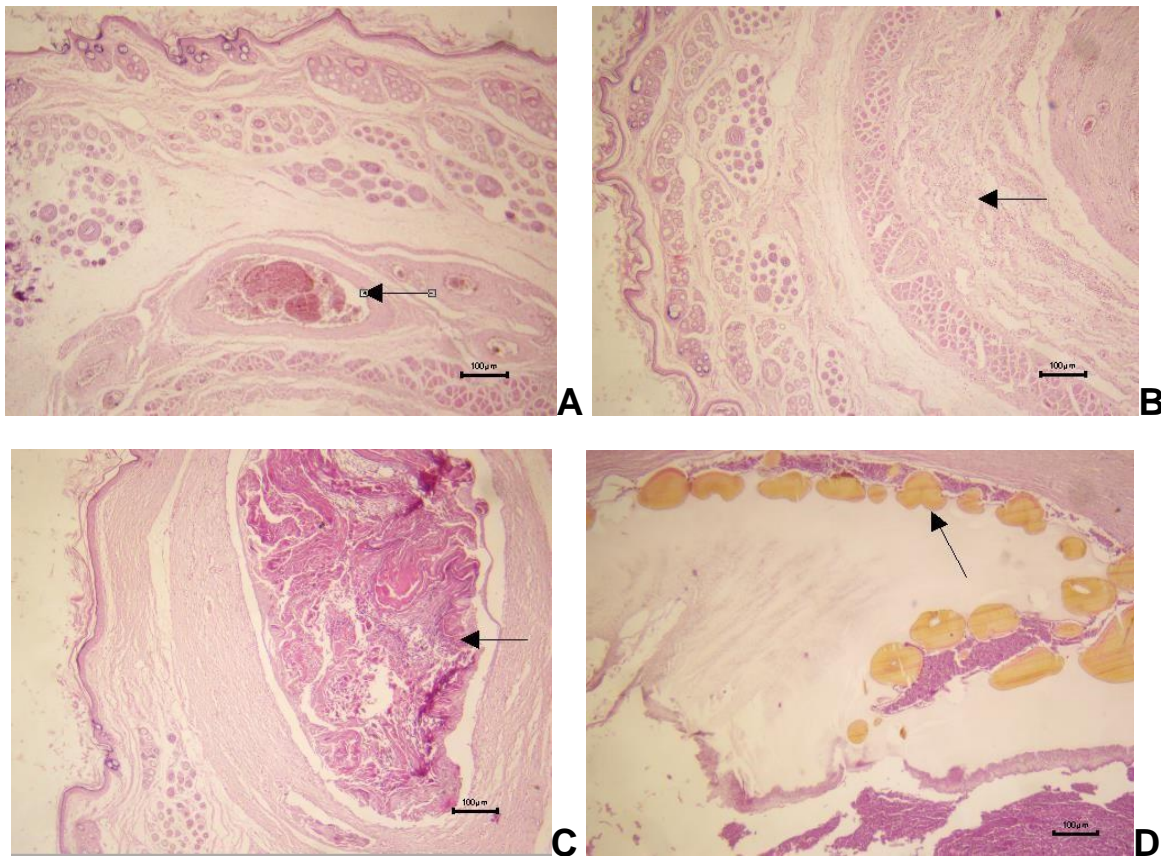


Figure 3. Photomicrographs of lesions produced by *Cuterebra* spp larvae, hematoxylin and eosin (H&E) staining. A greater thickening is observed at the level of dermis and hypodermis, with parasitic remains (arrow) 40X (A); Layer of fibrous connective tissue (arrow) delimiting the parasitic structure, 40X (B); zone of necrosis associated with parasitic destruction delimited by fibrous connective tissue 40X (C); zone of inflammatory reaction and necrosis caused by the parasite spicules (arrow) embedded in fibrous connective tissue at the level of the dermis 40X (D)

In this sense, it is important to control the urban expansion of cities so as not to affect ecosystems and the spread of wildlife diseases. It is clear that the main transmission of zoonotic and emerging diseases is due to this type of coexistence, which is an important point to take the necessary precautions to avoid the spread of this myiasis to the human



population. It is worth mentioning that the populations at greatest risk are children and the elderly, in conditions of extreme poverty, and due to the difficult accessibility of health services, it could be a risk in the human population.

There is also a need for more research on the presence of *Cuterebra* spp. in other species in the region, both wild and domestic, to determine the impact of this larva on the affected species.

CONCLUSIONS

It is concluded that although there are no reports of myiasis by *Cuterebra* spp. in Sonora, and it is not given adequate attention or follow-up, there is evidence of wildlife with cutaneous myiasis by this parasite, close to highly populated places and where there is the presence of companion and production animals, which could represent a public health risk.

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Errata Erratum

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