

Sporothrix brasiliensis in cats from Santiago, Chile

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ABSTRACT

We report *Sporothrix brasiliensis* infection in three cats from Santiago, Chile. Recently, *S. brasiliensis* was reported in cats from the southernmost region of Chile located 2,190 km from Santiago. Our findings emphasize the emergence of *S. brasiliensis* in the Chilean context, reflecting its rapid expansion across South America in recent years. Veterinarians should include *S. brasiliensis* in the differential diagnosis of skin conditions in cats.

1. Introduction

Sporotrichosis is a neglected cutaneous mycosis that affects both humans and animals. This fungal infection can be acquired through various means, including traumatic inoculation from soil and plant material or through bites or scratches from infected cats. The disease is caused by *Sporothrix schenckii sensu lato*, which is a complex consisting of at least four species: *Sporothrix brasiliensis*, *S. schenckii sensu stricto* (*s.s.*), *S. globosa*, and *S. luriei*. Among these species, the two most significant are *S. schenckii s.s.*, responsible for human sporotrichosis worldwide, and *S. brasiliensis*, which is known for its higher virulence [1]. In Brazil, *S. brasiliensis* has seen a significant spread over the last 30 years, causing diseases in both cats and humans. Between 1988 and 2011, more than 4,000 human cases and 3,804 cases in cats were diagnosed in Rio de Janeiro [2]. Furthermore, it is considered an emerging pathogen in Sao Paulo [3]. Currently, *S. brasiliensis* is documented in ten states across Brazil, including Sao Paulo, Rio Grande do Sul, Rio Grande do Norte, Mato Grosso, Minas Gerais, and Paraná [4]. The pathogen has also become highly endemic in other South American countries such as Bolivia, where it is one of the most common dermatologic fungal infections [5]. In Peru, an incidence of 48–60 cases per 105 inhabitants has been reported in the region of Abancay [6], and in Argentina, over the last eight years, cases of feline sporotrichosis have increased from 0.16 to 0.75 per month in 2019, involving zoonotic transmission [7].

In Chile, only five human cases of sporotrichosis have been reported in the literature, the first one published in 1982 and the last one in 2021

[8–13]. The aetiological agent identified in these cases was *S. globosa* [8], *S. pallida* [9] and *S. schenckii* [10–13]. Molecular diagnosis techniques were not employed in any of these cases. In the case of animals, *S. brasiliensis* was recently confirmed as the cause of an outbreak of feline sporotrichosis in the Magallanes region, the southernmost region in Chile [14]. Notably, the climatic conditions in Punta Arenas are moderated by its latitude and proximity to the ocean, with average lows in July nearing -1 °C and highs in January reaching 14 °C. These climatic conditions in which *S. brasiliensis* caused disease in these cats are notably different from the tropical and subtropical climates where *Sporothrix* typically causes human or animal disease. Furthermore, it remains unknown how the cats acquired the infection.

2. Cases presentation

The present article describes in detail one case of feline sporotrichosis identified in an urban area in Santiago the Chilean capital in 2022 (case A) and we also report the cytological and molecular diagnosis of two other cats from Santiago reported in 2023 (cases B and C). The cat from case A was a male, intact, domestic short hair, 2 years old. The cat exhibited multiple ulcerative skin lesions, mainly in head, limbs, and tail (Fig. 1) and respiratory distress. Prior to visiting to a Veterinary Hospital, the cat was treated with antibiotics and NSAIDs by his local Veterinarian, when only one lesion on the head was present, but he progressively deteriorated. At physical examination the patient had mild respiratory distress and poor body condition. He was negative to

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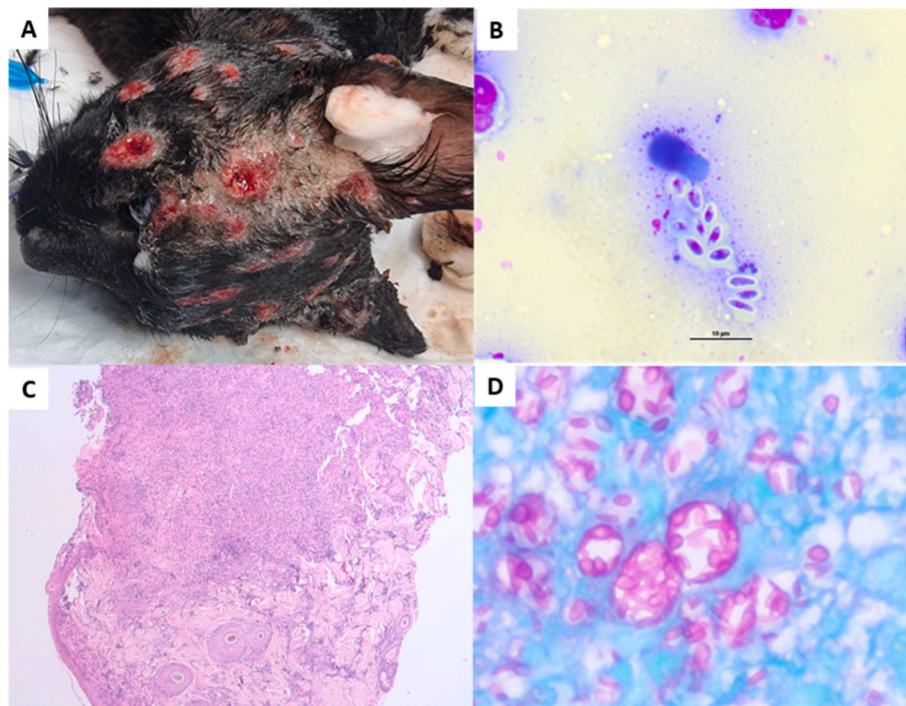


Fig. 1. *Sporothrix brasiliensis* lesions in a cat (case A). A) Gross (clinical) image showing multifocal to coalescing ulcerative and exudative skin lesions on the head, face and neck. B) Fine needle aspirate and smear from one of the lesions described in A). Several fungal yeasts are seen in the cytoplasm of a macrophage and free in the background. These are oval (“cigar-shaped”), 3–5 μm in diameter and 5–9 μm in length, with a clear cell wall. May-Grünwald Giemsa stain. 500X original magnification. C) Low power histologic image of one of the skin lesions. These consist of a dense pyogranulomatous infiltrate that ulcerates the epidermis. Hematoxylin and Eosin. 100X original magnification. D) Yeasts are PAS positive and can be seen in the cytoplasm of macrophages and free between the inflammatory cells. Periodic acid-Schiff. Digital magnification of a 200X original image.

retroviruses. The CBC showed neutrophilia and mild monocytosis with a reactive thrombocytosis attributed to inflammation and the clinical chemistry revealed hyperglobulinemia consistent with an immune response. The cytologic findings from fine needle aspirate revealed chronic suppurative inflammation with the presence of fungal yeasts characterized by an oval (“cigar”) shape, 3–5 μm in diameter and 5–9 μm in length, with a lightly basophilic cytoplasm and pink nuclei with a non-stained cell wall (Fig. 1). Additionally, biopsy consisting in six fragments of haired skin showed pyogranulomatous diffuse dermatitis, with intralesional fungal PAS-positive yeasts, aetiology consistent with *Sporothrix* spp. After several weeks, the culture confirmed the presence of *Sporothrix* spp. DNA was extracted from the culture plates and the elongation factor-1 alpha (EF1 α) gene was amplified by PCR and sequenced using primers previously described [1]. The sequence of the PCR product (Accession number OQ971924) was compared with the GenBank database using BLAST and confirmed *S. brasiliensis* as responsible for the infection. More specifically, the EF1 α sequence had 100% homology with the haplotype H9 previously described in Brazil [1]. The cat was treated with itraconazole (5 mg/kg/day) for 5 weeks achieving full recovery. In July 2023, we received two samples from cats residing in Santiago (referred to as B and C) that displayed multiple ulcerative skin lesions, mainly in head (Fig. 2). Cytological analysis confirmed sporotrichosis, and PCR/sequencing of the EF1 α locus also revealed 100% homology with the H9 haplotype. In both cases owners decided to euthanise the animals before any antifungal treatment was established.

3. Discussion

Feline sporotrichosis caused by *S. brasiliensis* remained sporadic, appearing in self-limiting clusters for decades in Brazil. However, it eventually escalated to an epidemic level, creating a public health emergency that impacted humans. The expansion of *S. brasiliensis* was significantly influenced by social issues within the country. In

Argentina, the earliest detection of *S. brasiliensis* occurred in the Misiones province, bordering Brazil, in 1986. Subsequently, it was detected in the Buenos Aires province in 1988. While it is considered an emerging pathogen in Argentina, its impact is notably less pronounced than in Brazil [7].

The cases presented here, along with the three feline cases reported in early 2023 in Punta Arenas, Chile [14], serve as a warning regarding the potential spread of this fungus in Chile. The origin of *S. brasiliensis* remains unclear, and it is uncertain whether the fungus has always been present in the country, or recently being correctly diagnosed thanks to the expertise of the veterinarians in charge since feline sporotrichosis can be misdiagnosed as neoplasia. Since the publication of these cases in southern Chile, unofficial reports have surfaced, indicating that several cases of feline sporotrichosis were diagnosed in pathology laboratories in Chile, although they were never officially published. This situation calls for collaboration among veterinarians, physicians, and public health officials to address the zoonotic threat posed by the expanding biogeographic range of *S. brasiliensis*.

Conflict of interest

There are none.

CRedit authorship contribution statement

María Carolina Escobar: Conceptualization, Methodology, Formal analysis, Visualization, Writing – original draft. **Federico Cifuentes Ramos:** Methodology, Investigation, Visualization, Writing – original draft. **Cristian A. Alvarez Rojas:** Methodology, Formal analysis, Visualization, Writing – original draft, Writing – review & editing.



Fig. 2. Case B Gross (clinical) image showing multifocal to coalescing ulcerative and exudative skin lesions on the head.

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