LETTER TO THE EDITOR

Case Report. A disseminated infection due to Chrysosporium queenslandicum in a garter snake (Thamnophis)

Eine disseminierte Chrysosporium queenslandicum-Infektion bei einer Strumpfbandnatter (Thamnophis)

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Schlüsselwörter. Chrysosporium queenslandicum, Strumpfbandnatter, Thamnophis, disseminierte Infektion.

Summary. A male garter snake (Thamnophis) from a private terrarium was spontaneously and simultaneously infected with Chrysosporium queenslandicum and Geotrichum candidum. The autopsy revealed disseminated mycotic alterations in skin, lungs and liver. Chrysosporium queenslandicum grew well at 28°C, the optimal temperature of the animal. This is the first description of a Chrysosporium queenslandicum infection in a garter snake.


Introduction

Chrysosporium species are ubiquitous moulds occurring commonly in soil, decaying leaves, wood, animal pastures and chicken yards [1–5], related to dermatophytes by their gymnoascocaceous perfect states, by their keratophytic ability and by their accessory conidia [6]. Members of the genus rarely cause diseases in humans and animals such as dermatomycosis, onychomycosis, endocarditis, osteomyelitis [7, 8]. We report the first case of disseminated Chrysosporium queenslandicum infection concomitant with a Geotrichum candidum infection in a garter snake.

Case history

A 3-year-old, male garter snake (Thamnophis) with a size of 76 cm from a private terrarium owner was presented for autopsy. The animal was born in the terrarium. Skin lesions were noted sub finem around the cloaca. The animal died in spite of the administration of itraconazole.

Gross morphology: The carcass was in bad nutritional condition and showed, 15 cm cranial to the cloaca, a 1.3 x 2 cm large, grayish-white cutaneous nodule. Both the hemipenis were markedly swollen and revealed macroscopically necrotic foci. Multiple submiliary to avenaceous whitish nodules were present in lungs and liver (Fig. 1). A muco-purulent mass filled the air sacs. The spleen
was slightly swollen. Kidneys and heart showed no alterations.

**Histology:** Examination of tissues from lungs, liver and skin revealed mycotic lesions at varying intensities. The liver showed abundant, marked necrosis with invasion into the vessels and thrombosis (Fig. 2). The hyphae, surrounded by a necrotic mass, measured 2.5 × 3–80 μm and were septated. In the lungs, desquamated alveolar cells and granulocytes filled the acini. Two kinds of hyphae were seen in the lungs: the first were similar to those detected in the liver, and the second showed budding cells, that were compatible with *Geotrichum candidum* (Fig. 3). The severity of the lesions desorganised completely the pulmonal architecture of the snake lungs.

Intraepidermal neutrophilic abscesses and granulomatous structure with few foreign type giant cells were observed.

Kidney, heart and pancreas were free from any mycotic lesions histologically.

**Mycology:** The aetiological agent isolated was identified as *Chrysosporium queenslandicum* Apinis & Rees. The fungus showed a good growth (45–70 cm diam in 14 days) at 28°C as white, feity, fluffy to velvety, up to 2–3 mm high and dense colonies. The reverse on Sabouraud glucose agar was pale creamy yellow. A poor growth was noted at 34°C and at room temperature, but no growth was observed at 37°C.

The hyphae were hyaline, thin-walled, 1.5–6.5 μm wide and often fragmented. The last feature complicates the microscopic examination both in direct preparation and in slide cultures.

The isolate is deposited in the institute fungus collection (Dr Vissiennon, Leipzig, Germany) as M39 and in the CBS (Baarn, NL) as CBS M253.

**Discussion**

Originated from North America, the genus *Thamnophis* compromises more than 22 species of garter snakes. They are viviparous reptiles and kept as hobby animals in terraria. With a length of 20–130 cm, head and neck have almost the

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**Figure 1.** Gross pathological finding: (a) grayish-white cutaneous nodule; (b): miliary to avenaceous whitish foci in the lung.
same diameter and the tail tapers toward to its apex. During the day active snakes love humidity and are met in the wilderness near lakes, lagoons and marshy areas [9–11]. The optimal keeping temperatures are 22–26 °C. Night temperatures around 15 °C are recommended. The snakes can reach in capture an age of 11 years [10]. The present case was 3-year-old.

Data about its immunological state were not available. However, the isolation of Chr. queenslandicum from air-dust particles, animal folds, various animals and sewage sludge [4, 12–14] on the one hand, and the good fungal growth at 28 °C, the optimal keeping temperature of the animal, on the other hand should favour the infection. Therefore the fungus can be considered as a permanent hazard risk for the snake. It is to be feared, that, Chr. queenslandicum becomes an emerging agent in terraria. Measures to reduce the fungal population such as cleaning, less use of woods and natural matters in terraria should be taken for sensitive animals (e.g. old or otherwise weakened snakes).

With its inability of growing at 37 °C, the fungus should be considered as pathogen for poikilothermic animals, but has no medical importance for mammals and birds.

Originally isolated from feathers of domestic fowls, ducks and turkeys in Southern Queensland (Australia) by Apinis & Rees [15], the fungus was found to be involved in diseases in a small mammal by Gugnani and in a nonspecified snake by Ajello [16, 17]. To our knowledge, the present case is the first description of a Chr. queenslandicum-infection in a garter snake.

The identification of the fungus can cause some difficulties to the nonskilled mycologist. However, the growth temperatures (22–32 °C with an optimum at 28 °C), the white fluffy to velvety colony with a pale creamy yellow reverse on Sabouraud glucose agar, 1-celled, 3.5–10×3–6 µm conidia, can provide the suspicion on Chr. queenslandicum. The final diagnosis can be performed only by a skilled specialist.

Similar to other mycotic infections, the pathologic-anatomical findings are indistinguishable from those of other septicemic infections (e.g. mycobacterial infections, salmonellosis).

The histology differed from the dichotomously branching hyphae encountered in Aspergillus infec-

Figure 2. Liver: thrombosis (*), in an invaded hepatic vessel. Note the surrounding necrotic foci (GMS, H & E-counterstained, × 200).

Figure 3. Lung: desquamated alveolar cells with septated branching hyphae (big arrow) and budding yeast-like cells (thin arrow) in the lung. (GMS, H & E-counterstained, × 400).
tions [18, 19], but also from alterations due to 


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References


