

DEVRIESEA AGAMARUM ASSOCIATED DERMATITIS IN A SPECIMEN OF BEARDED DRAGON, *POGONA VITTICEPS* (AHL, 1926) (SQUAMATA: AGAMIDAE) IN PARAGUAY

DERMATITIS ASOCIADA A *DEVRIESEA AGAMARUM* EN UN EJEMPLAR DE DRAGÓN BARBUDO, *POGONA VITTICEPS* (AHL, 1926) (SQUAMATA: AGAMIDAE) EN PARAGUAY

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Resumen.– *Devriesea agamarum* es una bacteria gram-positiva asociada a los dragones barbudos (*Pogona vitticeps*), pero con un gran potencial patogénico en lagartos de la familia Agamidae. En este trabajo reportamos un caso de dermatitis asociada a *D. agamarum* en un dragón barbudo en Paraguay, que constituye el primer reporte del patógeno en el país.

Palabras clave.– Actinobacteria, Agamidae, Agar sangre, propóleo.

Abstract.– *Devriesea agamarum* is a gram-positive bacterium associated with bearded dragons (*Pogona vitticeps*), but with great pathogenic potential in lizards of the family Agamidae. In this paper we report a case of dermatitis associated with *D. agamarum* in a bearded dragon in Paraguay, which is the first report of the pathogen in the country.

Key words.– Actinobacteria, Agamidae, Blood agar, propolis.

The bearded dragon (*Pogona vitticeps*) is an agamid member of the class Reptilia, order Squamata, which is native to Australia but is currently one of the most popular pet reptiles worldwide (Raiti, 2012; Johnson & Adwick, 2018). *Devriesea agamarum* is a gram-positive, non-motile actinobacterium, that has been reported as part of the oral microbiota of bearded dragons, but is also associated to cheilitis, dermatitis and septicemia in lizards (Martel et al., 2008; Hellebuyck et al., 2009a). The pathogen, since its description, has been associated as causative agent of symptomatic and asymptomatic infections in different lizard species (Martel et al., 2008; Lukac et al., 2013; Schmidt-Ukaj et al., 2014; Gallego et al., 2018). The objective of this work is to report the presence of *D. agamarum* in skin lesions of a captive bearded dragon (*Pogona vitticeps*) in Paraguay.

An adult, female, bearded dragon (*P. vitticeps*) was brought to the Wild Animal Practice in the Facultad de Ciencias Veterinarias,

Universidad Nacional de Asunción, Paraguay, for clinical evaluation following confiscation by the Ministerio del Ambiente y Desarrollo Sostenible (MADES, Ministry of the Environment and Sustainable Development in Spanish). The animal had a weight of 405 g, with a good body condition. Since the animal came from a seizure, no background data could be obtained as to age, feeding, husbandry, etc. The patient kept a healthy appetite, and immediately accepted morio worm (*Zophobas morio*) and cockroaches (*Blattella germanica* and *Nauphoeta cinerea*).

Upon clinical inspection, the patient presented hyperkeratotic dermatitis in the center of the chest, abdomen, and left arm, with scaling (Fig. 1). One finger in the left hand was lost, associated to one of the lesions. The wounds in the center of the thorax and in the left hand were debrided with sterile instruments, and the interior was swabbed. The swabs, as well as the removed scales, were deposited in sterile tubes with Stuart medium and sent to

the Centro de Diagnóstico Veterinario del Paraguay (Cedivep, Center for veterinary diagnostics of Paraguay, in Spanish). The wounds were treated topically with 20% propolis tincture once a day (Vetter & Pintos, 2023) while awaiting the culture, and eventually healed completely after 20 days, without using antibiotics.

The skin swab was cultured in two plates with Tryptone Soya Agar (Oxoid® - Ref: CM131B) (with 5% of sheep blood)

and one plate with McConkey Agar (Oxoid® - Ref: CM0115B). The McConkey plate and one blood agar plate were incubated aerobically at 37°C, while another blood agar plate was incubated in microaerophilia (5% CO₂ atmosphere) at 37°C. After 48 hours, smooth, mucoid, whitish, small colonies surrounded by a narrow zone of haemolysis were observed on the plate incubated in microaerophilia (Fig. 2), but no growth was observed in other plates. Gram stain from isolated strain showed Gram-positive short rods (Fig. 3). They were positive to catalase test



Figura 1. Lesiones cutáneas hiperqueratósicas y descamativas en el centro del tórax, abdomen y brazo izquierdo de un individuo de *Pogona vitticeps*. Foto: J. Richard Vetter & Héctor R. López.

Figure 1. Hyperkeratotic and scaling skin lesions in the center of the chest, abdomen, and left arm of an individual of *Pogona vitticeps*. Photo: J. Richard Vetter & Héctor R. López.

(3% hydrogen peroxide), and Cytochrome Oxidase Bioanalyse®-Ref: ASD07230) test was negative. To determine a biochemical profile, Sulfide indole motility (SIM) (SIM Medio, Britania®- Ref: B0213105) was negative, Triple Sugar Iron (TSI) (Oxoid®-Ref: CMO277) turned weakly acid/acid, and Urease test (Ureasa agar base, Oxoid®- Ref: CMO053) was weak positive. The results were compatible with *Devriesea agamarum* (Martel et al., 2008).

Routine examination of lizards, particularly *Uromastix* spp., *Agama impalearis*, *Crotaphytus collaris*, *Sauromalus obesus*, and *P. vitticeps*, will allow quick detection of suspicious crusting and dermatitis, paying special attention to the mouth, cloaca, elbows

and knees, where hyperkeratotic dermal lesions, swelling, and plaque formation should include *D. agamarum* as a differential (Pasmans et al., 2008; Hellebuyck et al., 2009a). No other biochemical tests were performed, such as those mentioned by Marten et al. (2008). Clinical lesions with the characteristics of the isolated strain proved to be an important guide to determine that the isolated strain is *D. agamarum*; however, a greater number of biochemical tests are necessary, as well as molecular test, to confirm the strain. As the isolated bacteria is unconventional, it is not found in standard manuals such as the CLSI (Clinical & Laboratory Standards Institute) and for this reason the antibiogram was not performed.



Figura 2. Colonias lisas, mucoides, blanquecinas, pequeñas, rodeadas de una zona estrecha de hemólisis en el agar triptona-soja con 5% de sangre de oveja, cultivadas en microaerofilia durante 48 horas. Fotografía: M. Fátima Rodríguez & Edith Ruiz Díaz.

Figure 2. Smooth, mucoid, whitish, small colonies surrounded by a narrow zone of haemolysis in the tryptone-soy agar with 5% sheep blood, cultured in microaerophilia for 48 hours. Photograph: M. Fátima Rodríguez & Edith Ruiz Díaz.

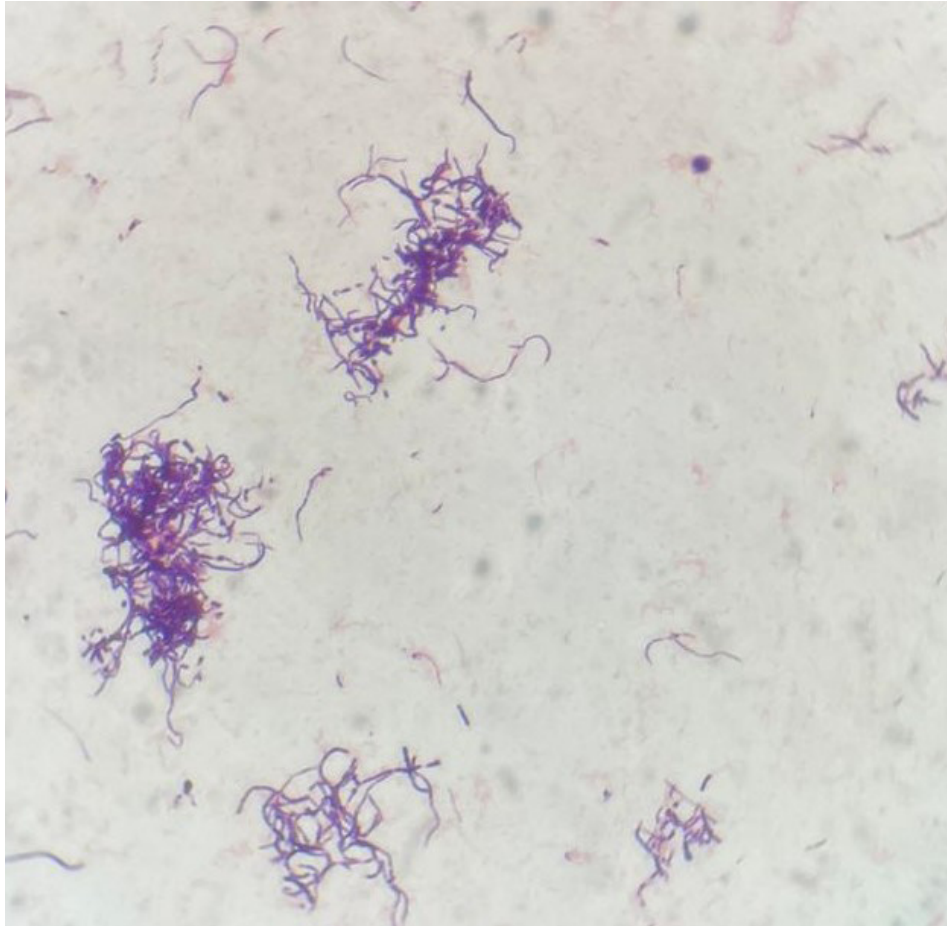


Figura 3. Bacilos cortos gram-positivos aislados del cultivo obtenido. Gram, 100X. Fotografía: M. Fátima Rodríguez & Edith Ruiz Díaz.

Figure 3. Gram-positive short rods isolated from the obtained culture. Gram, 100X. Photograph: M. Fátima Rodríguez & Edith Ruiz Díaz.

Devriesea agamarum is highly resistant in the environment and a single clone of the pathogen can become endemic in a captive colony, persistently causing severe disease, adding to the challenge that eliminating the pathogen from a collection can be difficult as all clinically infected animals require treatment as well as environmental decontamination, without even considering asymptomatic infections and reservoirs (Hellebuyck et al., 2011; Devloo et al., 2011). Different effective treatments have been reported, such as third-generation cephalosporins, ceftiofur hydrochloride, and topical chlorhexidine (Hellebuyck et al., 2009b; Lukac et al., 2013; Schmidt-Ukaj et al., 2014; Gallego et al., 2018).

The bacteria in this case could have been inoculated through bite wounds, as the entity has been isolated from oral samples and is considered part of the oral microbiota in healthy bearded dragons (Hellebuyck et al., 2009a; Bauwens et al., 2014; Kubiak,

2020). The diagnostic exams include molecular tests performed on oral and tissue samples (Bauwens et al., 2014; Brockmann et al., 2023), which can now be applied in Paraguay as the presence of the pathogen has been confirmed. The present report demonstrates the occurrence of *D. agamarum* in a bearded dragon in Paraguay, which has to be taken into account when managing lizard collections, and as a differential diagnosis whenever skin lesions are detected in these species.

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