

Submitted: 18. 04. 2020

Published: 22. 04. 2020

Fluorescence predicts survival of chameleon eggs

ADAM GREENBERG¹ & PETR NEČAS²

¹ *agpolymath@gmail.com*

² Corresponding author: *petr.necas@me.com*

Key words: Chameleons, *Furcifer pardalis*, captive, eggs, fluorescence, UV examination, fertility

Fluorescence is the emission of light by a substance, which has absorbed an electromagnetic radiation (incl. light). It has been reported from many organisms such as fungi, plants, invertebrates and vertebrates. These organisms utilize proteins, pigments, chitin, lymph and gland secretion for this purpose. The evolution and function of fluorescence is yet little known but basically can be divided in physiological use (e.g. for photosynthesis, photo protection, prey attraction) and communication (e.g. sex and species recognition). In chameleons, the fluorescence has been described just recently and it is hypothesized, they use it for sex- and species recognition. (Prötzel et al. 2018)

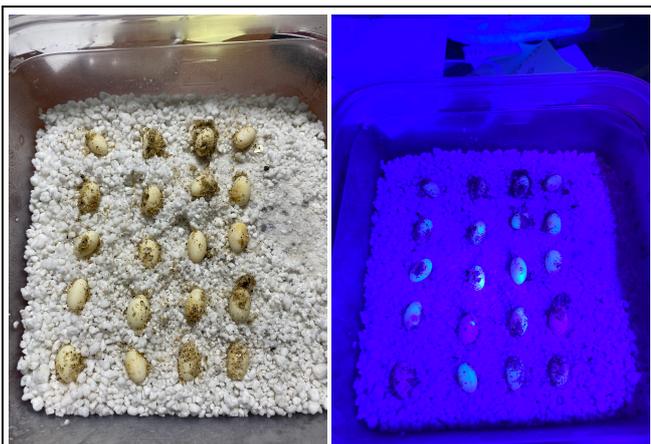


Fig.1: Fluorescence in *Furcifer pardalis* eggs infested with fungus
Photo: ADAM GREENBERG

UV light can be one of the electromagnetic radiation, causing immediate response in fluorescence. It has been used by biologists for search for scorpions in the wild (YOND 2011) and dermatologists to detect fungus on human skin

(ELSTON 2001).

Fungal infection of reptile eggs is a major cause of loss of embryos and is proven to be a consequence of eggs being infertile (MOREIRA & BARATA 2005).

UV light was tried on captive *Furcifer pardalis* (CUVIER 1826) eggs. Five separate clutches of this species were laid and incubated at room temperature (74° to 76°F / 23° to 24°C), and under exactly the same conditions on water saturated perlite in a snap lid plastic container. UV examination was carried out with UV flashlight (WINDFIRE Underwater UV Light 10W 395nm 3 X Cree LED Diving UV Ultra Violet Scuba Diving Blacklight Flashlight Torch with Magnetic Control 100m Waterproof Lamp Light) intended to see the possible reaction. In every case where all eggs fluoresced they became visibly infested by fungi within 4 weeks, then shriveled and died.

Early detection should enable anti fungal treatment early in some cases and allocation of resources to viable eggs in others, aiding breeders in husbandry. It isn't clear whether this may apply to eggs of all kinds.

CONCLUSIONS: UV offers very early detection of fungal infection and viability of chameleon eggs. This should help breeders either treat fungus or identify bad batches of eggs early so the keeper/breeder can allocate resources early.

LITERATURE

ELSTON, D.M. (2001) Fluorescence of fungi in superficial and deep fungal infections. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC57806/#_ffn_sectitle (16. 04. 2020)

MOREIRA, P.L. & M. BARATA (2005) Egg mortality and early embryo hatching caused by fungal infection of

Iberian Rock Lizard (*Lacerta monticola*) clutches. – Herpetological Journal, Vol. 15, pp. 265-272

PRÖTZEL, D., M. HEB, M.D. SCHERZ, M. SCHWAGER, A. VAN'T PADJE & F. GLAW (2018) Widespread bone-based fluorescence in chameleons. – Scientific Reports 8: 698

YOND, E. (2011) Why do scorpions glow in the dark (and could their whole bodies be one big eye)? <https://www.discovermagazine.com/the-sciences/why-do-scorpions-glow-in-the-dark-and-could-their-whole-bodies-be-one-big-eye> (16. 04. 2020)

ZHANG, S. (2017) Why Do Corals Glow in the Dark? A new study suggests they use fluorescence for photosynthesis. [https://www.google.com/amp/s/amp.theatlantic.com/amp/article/532992/\(16. 04. 2020\)](https://www.google.com/amp/s/amp.theatlantic.com/amp/article/532992/(16. 04. 2020))



Fig.2: Fluorescence in *Heterometrus laoticus* COUZIEN, 1981.
Photo PETR NEČAS

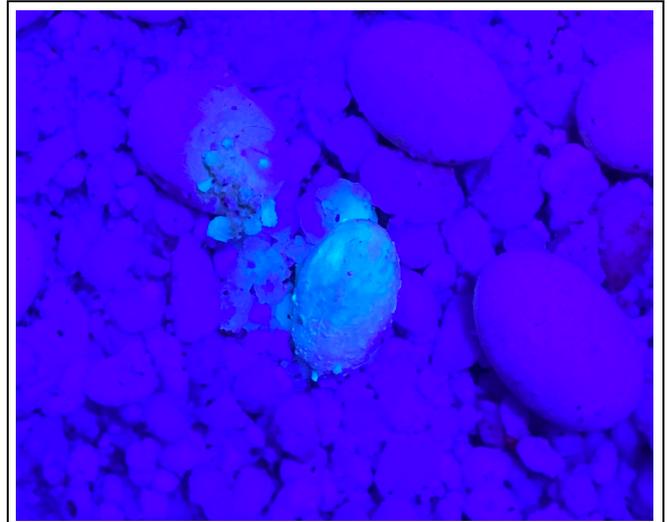


Fig.3: Fluorescence in *Furcifer pardalis* eggs infested with fungus
Photo: ADAM GREENBERG