



Does captivity affects skin colouration of wild caught amphibians?

Luiza F Passos^{1*}, Gerardo Garcia², Robert Young³

¹School of Psychology and Natural Sciences, Liverpool John Moores University. ²Chester Zoo³ School of Environment and Life Sciences, University of Salford Manchester

Introduction.

The current global amphibian crisis has resulted in an unprecedented rate of amphibian-biodiversity loss, resulting in a growth of captive breeding as a conservation tool for amphibians. Maintaining captive populations is important in terms of potential reintroduction. However, it has been shown that wild animals can easily adjust to captivity leading to phenotypic changes, including skin colouration. It is common to observe amphibians kept in captivity displaying a faded colouration. In amphibians, skin colouration influences courtship and mate preference, consequently affecting breeding success, resulting in advantages for selective females and for striking coloured males. The aim of this study was to investigate if the skin colouration wild caught frogs (*Dyscophus antongilii* and *Sciaphryne madagascariensis*) would change after one year in captive conditions at Chester Zoo.

Methodology:

The skin colouration of 20 (10 of each species) wild caught frogs *Dyscophus antongilii* (bright orange) and *Sciaphryne madagascariensis* (lime green and black) was measured every four months for a period of one year. A USB-2000 portable diode-array spectrometer and a PX-2 xenon strobe light source was used to perform spectrophotometric measurements on animals every four months over a period of one year. The equipment permitted that the spectral analyses were conducted in the 300 and 700 nm range. Colour measurements should sample the most visible surfaces to obtain a representative sample of the spectral shape of the entire body. Hue, chroma and brightness of skin colour were compared between sampling periods.



Results and Discussion.

Analyses showed no differences for *S. madagascariensis* on all parameters but significant differences for *D. antogilii* on chroma. Chroma can be defined as Chroma is a measure of the 'purity' or 'saturation' of a colour and is a function of how rapidly intensity changes with wavelength. The red colouration on *D. antogilii* is associated with carotenoids obtained from the diet, replicated nutritional requirements of amphibians is one of the main challenges faced by zoos. This could lead to different impacts, including a faded colouration. The green colouration on *S. madagascariensis* skin pattern is not associated with diet pigments but with light reflection off the surface of purine crystals by iridophores, not being affected by diet or environmental conditions. This results shows that the effects of captivity are species specific and, husbandry protocols should not be generalized. It is necessary to understand the environmental and nutritional needs of each species to ensure the conservation value of captive collections. If captive animals are bred for conservation purposes and a reintroduction is a future goal, these issues are of major concern.