

Cadmium exposure in Chelonians: Design of an experimental study using the red eared slider turtles, *Trachemys scripta elegans*



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INTRODUCTION

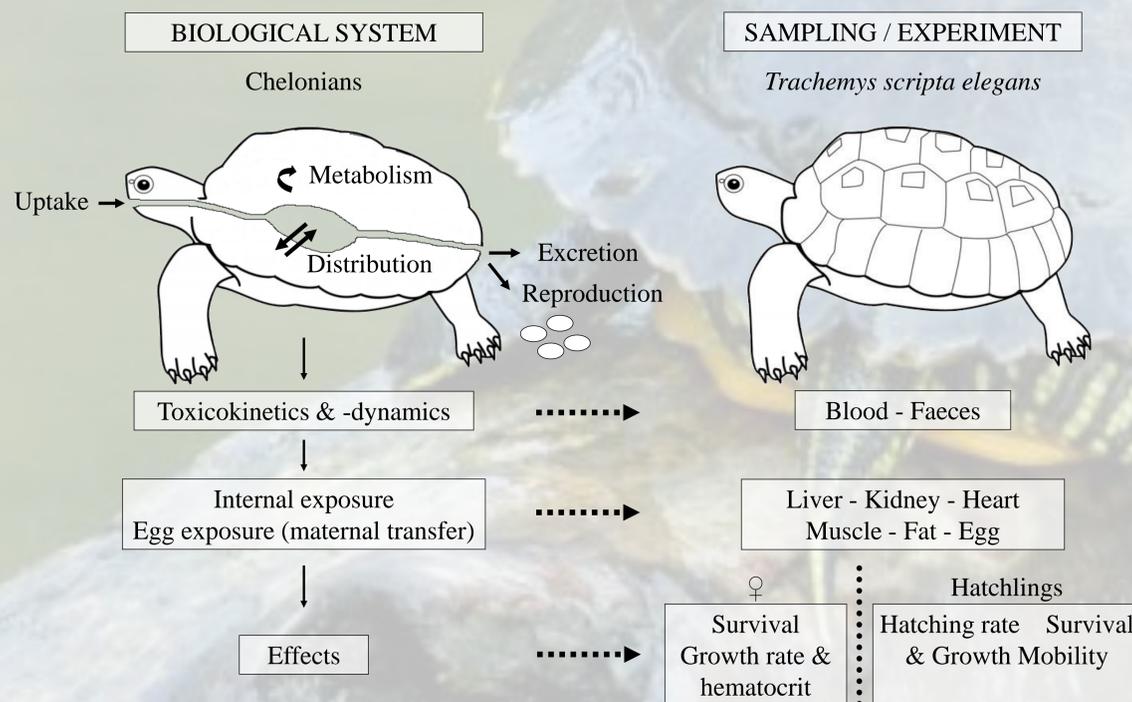


Environmental pollution is known to be a major threat for many species including reptile populations. There is therefore a real need of understanding the processes and effects of pollutants, such as uptake rates, accumulation, depuration of toxic compounds and effects on reproductive parameters particularly in endangered chelonians such as marine turtles.

Among environmental contaminants, **Cadmium (Cd)** is one of the most widely distributed and dangerous pollutants. Cd is known to be teratogen, carcinogen and a possible mutagen even at low concentrations. Marine turtles are protected species and therefore ethical consideration precludes experimental exposure. The use of the red eared slider turtle, *Trachemys scripta elegans*, is an interesting alternative model that bypasses many difficulties related to the study of wild chelonians: this aquatic species considered as an ecological pest can be raised in controlled conditions for experimental approaches.

PROBLEMATIC

The objectives of this experimental study were (1) to study Cd kinetic in the blood and faeces of red eared slider females fed with Cd contaminated food at **environmental concentrations**, (2) to assess the internal exposure and egg exposure after a long term trophic contamination and (3) to investigate the effects on female health status and reproductive parameters.



FIRST RESULTS

Samples of blood, faeces, organs and eggs are currently in analysis to assess Cd and other trace elements concentrations (ICPMS).

Survival rate for females was 100% after 13 weeks of exposure.

14 females nested successfully and 35 eggs were incubated on moist vermiculite. Hatching success was higher in control females and lower in T3 females but did not differ significantly between treatment (figure 1).

After a month, all hatchlings survived. Hatchlings were then tested for mobility test (ongoing analysis).

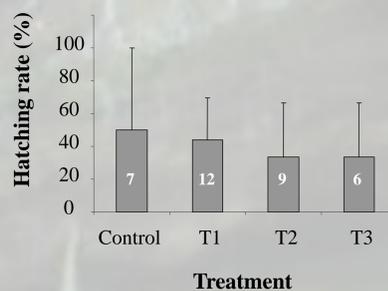


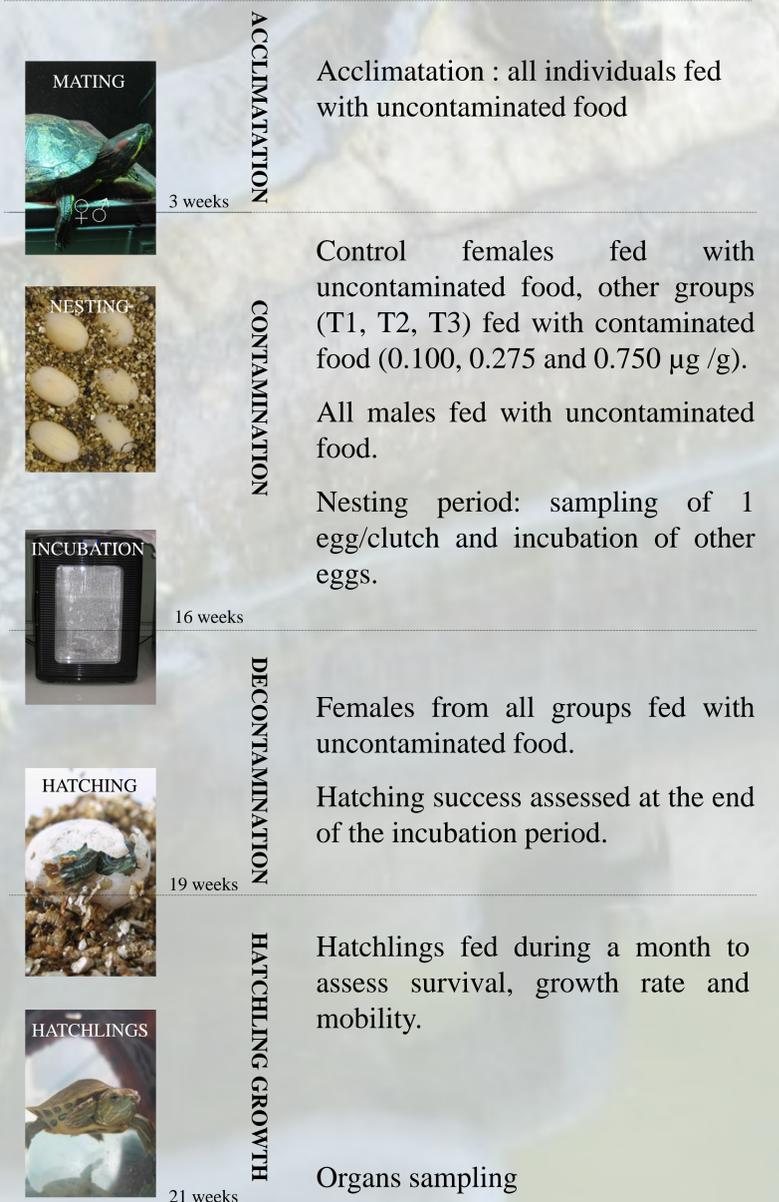
Figure 1. Hatching success according to the treatment received during the experiment. Number of eggs per treatment are indicated on the figure.

METHOD



After hibernation, 32 female's red eared slider turtles into 4 groups.

Sampling of blood every 2 weeks and faeces collected during the whole experiment.



CONCLUSION

This study is the first to develop a method to assess the exposure to endogenous Cd in turtles, to investigate the kinetic of accumulation and depuration of Cd in females (uptake rates in blood and excretion via faeces) and to quantify the effects on reproductive parameters. This kind of experimental data are greatly lacking in the literature and we hope that the results of this study in controlled laboratory conditions will help to better understand the processes and effects of environmental contamination in wild populations.

The first results seem to indicate that the trophic exposure to Cd do not decrease hatching success. However, hatching success may not be the most sensitive parameter to Cd effect. That's why other parameters such as hatchling growth rate, survival or mobility are needed to assess the effect of Cd on reproductive parameters in chelonians.