Preliminary Findings on Detection of Reptile Egg Viability During Incubation using the Buddy® Digital Egg Monitor

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In captive breeding conditions, most reptile eggs are incubated artificially. The early detection of viable eggs means that infertile or non-developing eggs can be rapidly excluded from the incubation unit as these are potential sources of infection. Traditionally candling has been used to detect embryonic development but a disadvantage is that embryonic death is not immediately obvious and that in certain species candling is only useful quite late in development or not at all in thick-shelled species. The use of Doppler to detect embryonic heart rate has been reported in some species but the gel is known to damage the eggs. We propose the use of a non-invasive portable digital egg monitor developed for the use of bird egg monitoring to detect viability in different species of chelonian, saurian and serpentes eggs. The Buddy® monitor uses a single or triple LED light source emitting infra-red light and a light sensor which detects the variation in intensity of absorbed versus reflected infra-red light caused by arterial pulsatile vasculature within the developing fertile egg membranes. Readings using the triple LED were less reliable in very thin shelled eggs where the single diode resulted in more consistent and earlier results. However the triple LED appeared to be more reliable across species later in the incubation period. Reptilian embryonic heart rates are much slower than those of developing avian embryos and initial readings typically start at an average of 75 beats per minute (BPM) regardless of species. When nearing the end of incubation they may drop to below 30 BPM in some species, at which point they are no longer detected by the monitor which reads between 30 – 600 BPM. Initial data appears to demonstrate a rise in the heart rate just prior to hatching (24 – 48 hours) but more hatch data is needed to verify this finding. The smallest egg monitored was that of a mindy gecko (*Tarentolla mindiae*) weighing 0.95g and measuring 14mm x 10mm; while the largest egg monitored was that of a komodo dragon (*Varanus*

komodoensis) weighing 170g and measuring 59.9mm x 86.9mm. This is the first report of a digital method for monitoring reptile eggs. By establishing trends in the embryonic heart rate of different species it is hoped that the data could be used to accurately predict hatch date and to further detect hatchling distress enabling decisions to be made about intervention during hatching.