Hatching artefacts in Hermann's tortoise (*Testudo hermanni*) after artificial incubation

Mateja Stvarnik,[a] Igor Klobu ar,[a] Renata Knific,[b] Gordana Gra ner,[c] Alenka Dov [b]
[a] Clinic for Reproduction and Large Animals, Veterinary Faculty, University of Ljubljana, Slovenia
[b]Institute for Poultry, Birds, Small mammals and Reptiles, Veterinary Faculty
University of Ljubljana, Ljubljana, Slovenia
[c]Department of Hygiene, Behaviour and Animal welfare
Faculty of Veterinary Medicine, University of Zagreb, Zagreb, Croatia

After end of a hatching season for Hermann's tortoise (*Testudo hermanni*), from end of May to beginning of September, all unhatched eggs were examined. Hatching remainder represented 19.2% (3,557) of all eggs (18,520). Viability rate for incubated eggs was 80.8%. Eggs were harvested at the farm and immediately put into hatcheries. Temperature of hatching varied from 31 to 32°C. Moisture was maintained by placing the eggs on substrate (vermiculite), which was occasionally moistened. On average, moisture was 80%. Average hatching time was 67 days. Data on embryonated and unfertilized eggs were analyzed. Of all unhatched eggs, 61.0% were unfertilized, 52.5% were infected, and 19.1% was in various stages of dehydration including mummification; there was a percentage overlap as 2 or more causes (unfertilized, infected, dried) were identified in some eggs. Fertilization and development were not confirmed in 24.1%. Main reason for presence of multiple abnormalities was infection with various pathogens, with most common bacterial and fungal infections due to *Pseudomonas aeruginosa*, *Bacillus* sp. and *Purpureocillium lilacinum*. Unfortunately, in some cases, bacteria and fungus remained undetermined. Data on fertilized eggs were further classified into 3 groups according to stage of fetal development. Embryos in first third of development phase were present in 2.2%, in second third in 5.4% and in last third phase in 7.3% of total number of unhatched eggs. Most tortoises died before hatching, whereas only a few remained alive (0.7%). In all 3 groups, only 14.9% embryos were confirmed. From these embryos, one-fourth belonged to the second development stage and three-fourths to third stage. Some were completely developed and just unable to peck the shell. Dead and alive creatures were identified in 0.6% of total number of fertilized eggs. Misshapen carapace and tail, lack of pigment, open coelomic cavity, missing eye or other parts of the body, and conjoined twins were the most commonly abnormalities.

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