

# Field-based radiography and ultrasonography of *Emys orbicularis*

B. Amphimaque<sup>1</sup>, K. Schönbächler<sup>2</sup>, S. Hoby<sup>2</sup>, D. Schweizer<sup>1</sup>

<sup>1</sup>Vetsuisse Faculty, University of Bern, Department of Clinical Veterinary Medicine, Division of Clinical Radiology, Länggassstrasse 128, 3012 Bern, Switzerland

<sup>2</sup>Bern Animal Park, Tierparkweg 1, 3005 Bern, Switzerland, email to: benedicte.amphimaque@Vetsuisse.unibe.ch

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## Introduction:

*Emys orbicularis* is an endangered species in Switzerland. A national program has promoted breeding and release of individuals into suitable habitats since 2010. Radiography and ultrasonography allow evaluation of chelonians' skeletal system and internal organs.

The aim of this prospective study was to determine the feasibility of radiography and ultrasonography for health assessment before reintroduction.

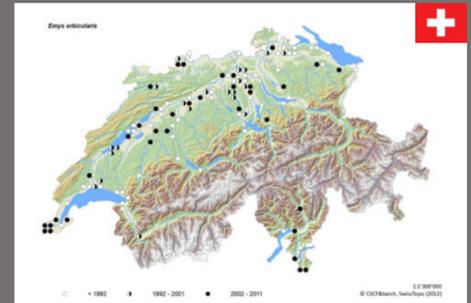


Figure 1. *Emys orbicularis* in Switzerland © [www.karch.ch](http://www.karch.ch).

## Materials and methods:



Figure 2. Positioning of *Emys orbicularis* during radiography.

- Radiography was performed in 84 animals, using three projections, and was evaluated for changes of the skeletal, respiratory, gastro-intestinal, urinary and genital systems.
- Ultrasonography was performed in 45 animals using the cervicobrachial and prefemoral acoustic windows (Figure 3).

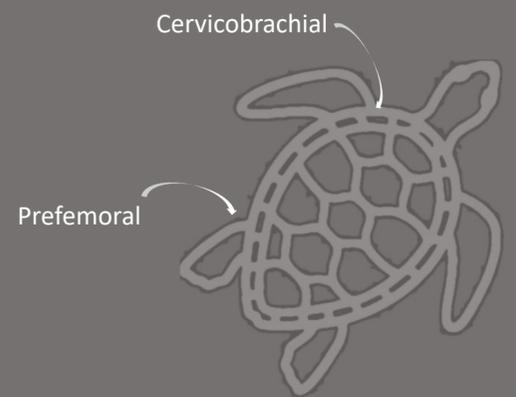


Figure 3. Acoustic windows for ultrasonography of turtles.

## Results:

The mean weight of the turtles was 569 g (range: 211 to 905 g). Radiographically, moth-eaten osteolysis was observed in 2/84 turtles (Figure 3).

Increased opacity of the lung was present in 9/84 (10.7%), three of them were positive for *Mycoplasma* spp. on polymerase chain reaction.

On ultrasound, no abnormality was identified. The visibility of the different organs in each acoustic window is reported in Table 1.

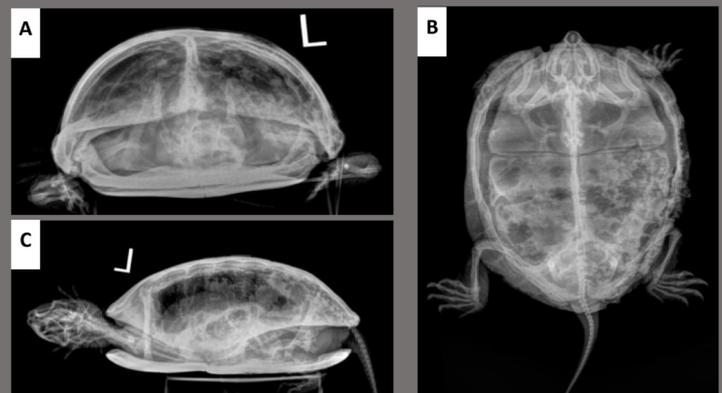
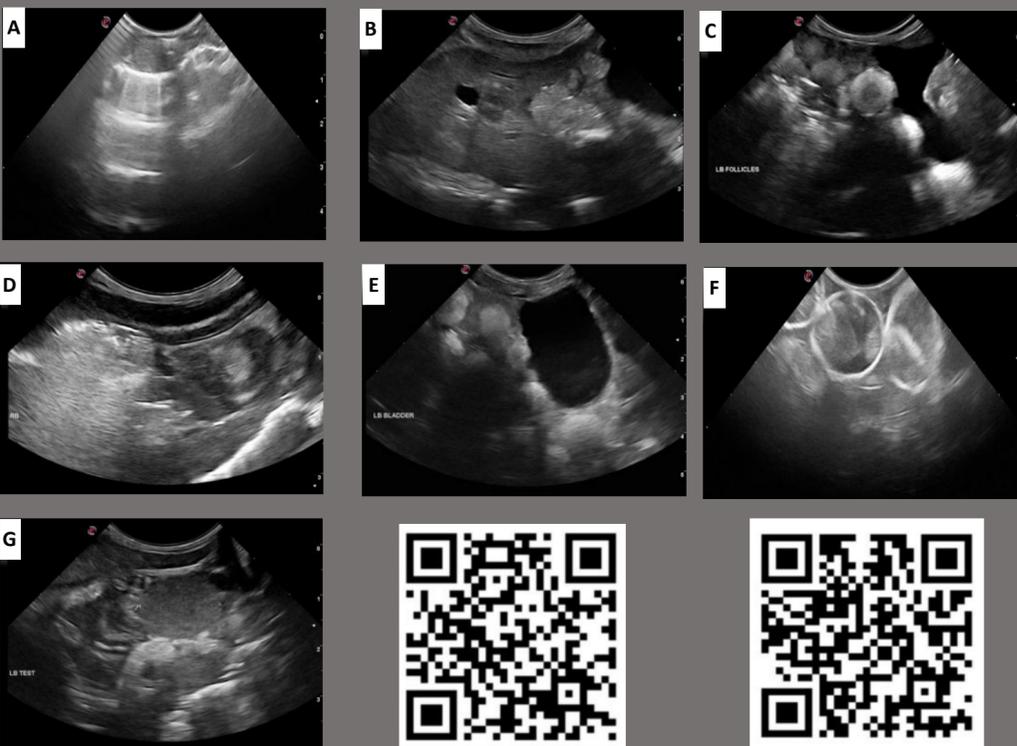


Figure 4. Craniocaudal (A), dorsoventral (B), and laterolateral (C) projections of individual with severe moth-eaten osteolysis due to shell necrosis.

Table 1. Numbers and percentages (in brackets) of visualization of the evaluated organs for each acoustic window in 45 turtles.

	Left prefemoral	Left cervicobrachial	Right cervicobrachial	Right prefemoral
Liver	43 (95.6%)	/	/	45 (100.0%)
Gallbladder	/	/	/	18 (40.0%)
Duodenum	/	/	/	32 (71.1%)
Stomach	37 (71.1%)	/	/	36 (80.0%)
Urinary bladder	32 (71.1%)	/	/	/
Gonads	42 (93.3%)	/	/	42 (93.3%)
Lung	/	45 (100.0%)	45 (100.0%)	/
Heart	/	22 (48.9%)	28 (62.2%)	33 (73.3%)



B-mode and color doppler cine loop of the heart

Figure 5. Ultrasound images of the lung (A), the liver and gallbladder (B), the follicles (C), the duodenum and stomach (D), the urinary bladder (E), the eggs (F), and the testes (G) of *Emys orbicularis*.

## Conclusion:

Radiography and ultrasonography were feasible techniques that provide good evaluation of both skeletal structures and internal organs. In general, the background prevalence of disease was low. Therefore, imaging for health assessment before reintroduction seems to only be indicated in case of suspected disease.

Schönbächler et al. HEALTH ASSESSMENT OF CAPTIVE AND FREE-LIVING EUROPEAN POND TURTLES (*EMYS ORBICULARIS*) IN SWITZERLAND. *J Zoo Wildl Med.* 2022 Mar;53(1):159-172.

Gumpenberger et al. SECRETS WITHIN THE BONY BOX- INSIDE VIEW ON CHELONIANS (AN OVERVIEW) in *EAVDI yearbook* 2019.

Michael Pees. DIAGNOSTIC IMAGING OF EXOTIC PETS, chapter reptile ultrasonography pp. 334-358. 2011.