

Id: 25558

Key: 0048457215

1st Theme Option: Diagnostics

Sub-Theme: Parasitological diseases

Type of Presentation: Oral Communication

Title: AQUAPATHLab: a web-based virtual pathology lab for diseases of aquatic animals

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Keyword's: imaging, virtual lab, microCT

Introduction: As aquaculture continues to grow, there is a parallel growth of the need for support in disease diagnostics. Recent advancements and modern tools in diagnostic methods together with the rapid progress and changes in the communication through the new web-based tools offer a unique opportunity for developing interactive e-platforms that could serve as hubs for exchanging information, education and collaboration of aquatic animal health specialists. Here we describe one such platform, the AQUAPATHLab, a virtual fish pathology laboratory.

Methodology: Several diseases have been selected to be used as a proof-of-concept but also as demonstration for the virtual lab. For the description of the pathologies we have used the microCT technology. Several samples have been scanned using the Skyscan 1172 microtomograph (Skyscan, Bruker, Belgium) at the Hellenic Centre for Marine Research). In addition, every pathology is described through histology and electron microscopy (Scanning and Transmission). Epidemiological and phylogenetic data are also provided where available.

Results: A web portal has been established in HCMR's site (<http://aquapath.hcmr.gr>). The user has access to all the uploaded information regarding 6 diseases. The diseases selected include diseases caused by bacteria (Eptheliocystis), parasites (*Ceratothoa oestroides*, *Sciaenocotyle pancerii*, *Henneguya aegea*) but also the non-infectious diseases, Chronic Ulcerative Dermatopathy and Systemic granulomatosis. For each disease, there is a general description and macroscopic photographs. There are also pictures from light microscopy of fresh squash preparations as well annotated histological sections. Through the use of Slice:Drop software the operator may have the ability to display and interactively manipulate the microCT datasets in 3D. Where available, molecular data have also been uploaded. Finally, the user has access to selected literature.

Conclusions: AQUAPATHLab is a virtual fish pathology laboratory offering a collection of several imaging techniques, including microtomography, histology, SEM, TEM that can be used for disease diagnostics. The digitization of fish diseases will create searchable and retrievable datasets to be explored online.

Funding of presentation: MOUNT (MIS 5002470), NSRF 2014-2020 co-financed by Greece and the European Union (European Regional Development Fund).