EURL for fish and crustacean diseases training course: Histopathology in fish and crustacean diseases 14th - 18th October 2019

Description of the course "Histopathology in fish and crustacean diseases", held at the European Union Reference Laboratory (EURL) for fish and crustacean diseases

Course content

The 5-days course is primarily based on a combination of practical work (hands on) and theoretical presentations. This course will focus on the use of histopathology in fish and crustacean diseases, combining a general histopathological approach with pathogen specific techniques such as Immunohistochemistry (IHC) and in situ hybridization (ISH). The first day participants will be shown how to take optimal samples for histopathological evaluation, considering different tissues and fish sizes. In the afternoon, lectures in pathology and histopathology will begin. During the next days, the participants will continue the training track with a combination of lectures and practical work and will be introduced to special staining methods or pathogen detecting techniques like IHC. In the second half of the course specific topics regarding crustaceans will be addressed. The course gives an introduction to general pathology and the specific histopathological lesions and lesion pattern that occur as a consequence of disease. Focus is put on the understanding of general pathological processes and on training in histopathological diagnostic skills. The course is dialogue based and sufficient time will be given for discussion under way. A social dinner will be organized the second evening. Further details are provided in the invitation letter.

General course objectives

The course aims to introduce participants to the use of histopathology in fish and crustacean diseases, combining technical knowledge on how to process samples including collection, fixation and the detection and description of lesions that can be observed during different disease stages of systemic infections.

The course will be structured on two main pillars: an overarching part on how to approach histopathology and combine theoretical knowledge on specific lesions to diseases patterns and a more specific part on Immunohistochemistry and In situ hybridization describing pitfalls and application of these techniques to specific pathogens.

Lectures will include descriptions of the techniques with major focus on their application, pitfalls and trouble shooting. Practical sessions and show-and-tell sessions will allow participants to spend time on the microscope individually observing prepared slides, open discussion as well as one-to-one supervision with the tutors.

Participants are encouraged to bring their own slides of fish and crustacean diseases to discuss the case with the other participants and tutors. If slides for the day with open discussion have not been sent beforehand they should be handed in on the first day.

Learning objectives

This course aims to introduce the students to pathology and histopathology of fish and crustaceans with the main focus on the systemic infections in farmed fish. The participants that will have completed the entire course and fulfilled the course's objectives:

Will be able to:

- sample organs and tissue for histopathological examination and submit them in a correct way

Will have gained knowledge:

- on how to discriminate between normal histology and artefacts that occurred during fixation and processing
- on how to detect and describe pathological changes and patterns in a systematic and uniform way
- on the technology for preparing IHC and ISH and how to assess pitfalls and errors in staining processes.

Overall, the course will allow participants to understand the underlying principles of the histopathology and specific techniques such as IHC and ISH, thus increasing the ability to evaluate histological slides and critically review results based on histopathological examination. Furthermore, the course will allow the participants to obtain a better understanding of specific staining methods thus increasing the ability to critically review these methods in order to assess pitfalls and to correctly interpret them

The major focus will be on systemic infections including listed fish diseases.
The course will provide a forum where pre-knowledge, experience and examples can be discussed between participants and teachers, and hereby raise the awareness of pitfalls when using the various techniques.

Intended learning outcomes

To increase the practical and theoretical knowledge of histopathology of systemic fish diseases including listed diseases. The course also aims at providing a forum where (good and bad) experiences can be discussed among participants and teachers.

The core elements

Histopathology of fish diseases
IHC applied to fish tissue
ISH applied to fish tissue

Assessment
During each day participants are encouraged to take part in the discussions on the subjects presented.
A specific session at the end of the course is allocated for discussion and evaluation of the course and at the end of the course a questionnaire for course evaluation will be delivered to all participants.

The course material
A course binder with practical information will be provided. The course binder will also be used for collection of hand-outs from the various lectures.

The course participants
Since course attendants can come from very different experiences, during the general introduction (day 1), researchers and technicians will be asked to introduce themselves, their pre-experience in the laboratory and their expectations to the course in order to target the course content optimally, especially during the theoretical- and discussion workshops. Their starting point will therefore be mixed as some may have limited theoretical or practical experience, while others may be highly experienced in some or all disciplines.

Course supervisors
Ole Bendik Dale, tutor responsible for pathology and histopathology in fish
Kelly Bateman, tutor responsible for pathology and histopathology in crustaceans
Tine Moesgaard Iburg, tutor and course facilitator
Niccoló Vendramin, course facilitator
Tutors responsible on IHC, ISH will be announced later

Draft programme (subject to changes

Day 1	Day 2	Day 3	Day 4	Day 5
Monday	**Tuesday**	**Wednesday**	**Thursday**	**Friday**
8:00-9:45 **Course introduction** **Participants will present themselves** **Place: Auditorium** **Coffee Break 9:45-10:15** **10:30-12:00** **Sampling for histopathological examination. Theory and Practice** **Place: Necropsy room KU**	**8:00-9:30** **Lecture on pathology and histopathology** **Place: Auditorium** **Coffee Break 9:30-10:00** **10:00-11:30** **Microscopy room I** **Practical exercise**	**8:00-8:30** **Introduction to DTU e-forms reimbursement** **8:30-9:30** **Lecture on IHC I** **Place: Auditorium** **Coffee Break 9:30-10:00** **10:00-11:30** **Lecture on IHC II** **Place: Auditorium**	**8:00 - 9:30** **Microscopy Room** **Show and tell of cases by Ole Bendik Dale with discussion and participation of course participants** **Coffee Break 9:30-10:00** **10:00- 11:30** **Microscopy room** **More show and tell**	**8:00 – 15:30** **Overview of Crustacean Tissues - Structure and Function** **Overview of WSSV & Overview of TSV and YHV** **Coffee Break 9:30-10:00** **OIE listed diseases and Emerging Pathogens** **Microscopy Practical**
Lunch 12.15 -13:00	**Lunch 11.30-12:15**	**Lunch 11.30 -12:15**	**Lunch 11:30 -12:15**	**Lunch 11:30-12:15**
13:00 – 15:30 **Lecture on pathology and histopathology** **Place:** **Auditorium**	**12:15 – 13:30** **Lecture on pathology and histopathology** **Place: Auditorium** **Coffee Break 13:30-14:00** **14:00-16:00** **Microscopy room II** **Practical exercise**	**12:15-13:15** **Theoretical exercise on IHC 1** **Place: Auditorium** **Coffee Break 13:15 – 13.45** **13:45-15:45** **Microscopy room III** **Practical exercise** **15:45 – 16:30** **Theoretical exercise on IHC 2** **Place: Auditorium**	**12:15-14:45** **Introduction to crustacean anatomy** **14:45-15:15** **Sampling for histopathological examination of crustacean. Theory and Practice** **Place: Necropsy room KU**	**12:15-15:15** **Microscopy Practical and Demonstration of Slide Scanner** **Show and tell of cases by Kelly Bateman with discussion and participation of course participants** **15.15 - Coffee, cakes and evaluation of the crustacean day** **Place: auditorium**