CIHEAM
International Centre for Advanced Mediterranean Agronomic Studies
Mediterranean Agronomic Institute of Zaragoza

MedAID Project - European Union

Advanced Course

APPLICATION OF EPIDEMIOLOGY IN AQUATIC ANIMAL HEALTH

Zaragoza (Spain), 25 February – 1 March 2019

1. Objective of the course

Epidemiology, as the study of health and disease status in populations, has great potential to improve animal health. In addition, current legislation requires the application of epidemiology to regulate animal movements and trade, and to implement risk-based surveillance systems. However, whilst in aquaculture health is managed at the population level, the application of epidemiology has lagged behind its use in livestock systems.

This course aims to provide participants with sufficient understanding of epidemiological approaches and principles so that they are able to apply them to their work. Specifically, the course will seek to raise the awareness of epidemiology so that the participants can constructively work with epidemiologists and understand, interpret and use results of epidemiological studies. Bringing together aquatic animal health specialists from the administration, industry and research to discuss health in the context of epidemiology will enhance communication and understanding between them.

At the end of the course participants will be able to:

- Understand the principles of disease causation.
- Investigate a disease outbreak.
- Identify routes of disease spread and appropriate biosecurity measures.
- Interpret results of a diagnostic test at the population level using sensitivity and specificity.
- Estimate sample sizes for determining disease freedom and prevalence.
- Assess health status in aquatic animal populations.
- Identify associations between disease and risk factors.

2. Organization

The course is organized by the **Mediterranean Agronomic Institute of Zaragoza** (IAMZ) of the **International Centre for Advanced Mediterranean Agronomic Studies** (CIHEAM), with the collaboration of the EU H2020 funded project **MedAID** (**Mediterranean Aquaculture Integrated Development**). The course will take place at the Mediterranean Agronomic Institute of Zaragoza and will be given by well qualified lecturers from research centres, universities and government departments in different countries.

The course will be held over a period of 1 week, from 25 February to 1 March 2019, in morning and afternoon sessions.

3. Admission

The course is designed for 25 participants with a university degree. It is intended for veterinarians and other aquatic animal health professionals, with or without previous formal training in epidemiology, but involved in delivering aquatic animal health services in either the private or public sector.

Given the diverse nationalities of the lecturers, knowledge of English, French or Spanish will be valued in the selection of candidates, since they will be the working languages of the course. IAMZ will provide simultaneous interpretation of the lectures in these three languages.

4. Registration

Candidates must apply online at the following address: http://www.admission.iamz.ciheam.org/en/

Applications must include the *curriculum vitae* and copy of the supporting documents most related to the subject of the course.

The deadline for the submission of applications is **3 December 2018.**

Applications from those candidates who cannot present their complete records when applying, or those requiring authorization to attend the course, may be accepted provisionally.

Registration fees for the course amount to 500 euro. This sum covers tuition fees only.

5. Scholarships

Candidates from CIHEAM member countries (Albania, Algeria, Egypt, France, Greece, Italy, Lebanon, Malta, Morocco, Portugal, Spain, Tunisia and Turkey) and candidates participating in MedAID project may apply for scholarships covering registration fees, or scholarships covering the cost of travel and full board accommodation.

Please display on a notice board if possible

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CIHEAM

See updated information at

www.iamz.ciheam.org

INFORMATION CONTINUES OVERLEAF

Candidates from other countries who require financial support should apply directly to other national or international institutions.

6. Insurance

It is compulsory for participants to have medical insurance valid for Spain. Proof of insurance cover must be given at the beginning of the course. Those who so wish may participate in a collective insurance policy taken out by the IAMZ, upon payment of the stipulated sum.

7. Teaching organization

The course requires personal work and interaction among the participants and with the lecturers. The international characteristics of the course favour the exchange of experiences and points of view.

The course will comprise both practical and lecture based teaching. Aquatic animal disease examples will be used to illustrate all subjects, and there will be a strong focus on applying the techniques learnt during the course in a series of practical sessions and discussions. To carry out the practical work with computers, participants will use free software such as EpiInfo7, Survey Toolbox and WinEpi.

8. Programme

1. Introduction and basic concepts (1 hour)
- 1.1. What is epidemiology and its role in aquatic animal health
- 1.2. Challenges to applying epidemiology in aquaculture
- 1.3. The epidemiological triad, criteria for causation and causal webs
- 1.4. Progressive Control Pathway (PCP) approach in biosecurity

2. Measuring disease frequency and reporting (3 hours)
- 2.1. Measurements of disease frequency
  - 2.1.1. Case definition
  - 2.1.2. Sampling
  - 2.1.3. Estimation of incidence and prevalence
  - 2.1.4. Biases: selection, information and confounding
  - 2.1.5. Reporting confidence of results
- 2.2. Monitoring morbidity and mortality at the farm level
  - 2.2.1. Questionnaire design
  - 2.2.2. Data storage
  - 2.2.3. Routine analysis
  - 2.2.4. Setting thresholds

3. Disease surveillance (2 hours)
- 3.1. Purposes of surveillance
- 3.2. Criteria for listing diseases
- 3.3. Classification of surveillance systems
- 3.4. Design of surveillance systems
- 3.5. International reporting and the role of the World Organisation for Animal Health (OIE)
- 3.6. The application of new technology
- 3.7. Case study: Disease surveillance in Norwegian aquaculture

4. Surveys to demonstrate disease freedom (2 hours)
- 4.1. Sampling procedures
- 4.2. Sample size calculation

5. Outbreak investigation and disease control (2 hours)
- 5.1. Case definition
- 5.2. Basic techniques
  - 5.2.1. Distinguishing propagating versus point source outbreaks
    - 5.2.1.1. Within-farm investigation: analysis by time, space, age, etc.
    - 5.2.1.2. Investigation of spread between farms: the index case and forward/back tracing
- 5.3. Minimizing spread of diseases
  - 5.3.1. Defining surveillance and protection zones
  - 5.3.2. Identifying and preventing routes of transmission

6. Interpretation of test results (diagnostic test characteristics) (2 hours)
- 6.1. Sensitivity and specificity
- 6.2. The impact of pooling
- 6.3. Negative and positive predictive values

7. Identifying risk factors for disease (3.5 hours)
- 7.1. Design of observational studies
- 7.2. Hypothesis formulation and testing
- 7.3. Analytical methods
  - 7.3.1. Analysis of 2x2 contingency tables
  - 7.3.2. Stratification
  - 7.3.3. Controlling confounding and interaction

8. MedAID project: epidemiological goals (0.5 hours)

9. Practical work (20 hours)
- 9.1. Discussions
  - 9.1.1. Open discussion: How does disease impact aquaculture? How can epidemiology improve aquatic animal health management?
  - 9.1.2. Group discussion: Biosecurity measures and resources to prevent disease introduction and spread
- 9.2. Interrogation of WAHIS database
- 9.3. Investigation of a disease outbreak
  - 9.3.1. Analysis of mortality data from a farm outbreak (analysis by time, space, age group)
  - 9.3.2. Forward and back tracing from an index case based on movement and other records
- 9.4. Assessment of diagnostic tests: calculation of sensitivity, specificity and predictive values
- 9.5. Designing surveillance to demonstrate disease freedom
  - 9.5.1. Sample size calculation for disease freedom
  - 9.5.2. Interpreting the results of disease surveillance
- 9.6. Sample size calculation for prevalence estimation
- 9.7. Calculations of prevalence and incidence
- 9.8. 2x2 tables and stratified analysis

10. Concluding remarks (1 hour)

GUEST LECTURERS

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