

Improving health and productivity in aquaculture

CEFAS has over 40 years practical experience in fish cultivation, fish and shellfish health, environmental impacts of aquaculture, and fish disease monitoring and assessment. We operate in over 40 countries around the world providing advice, research, consultancy, training and project management and appraisal.



- GENETICS
- WELFARE AND BEHAVIOUR
- NUTRITION
- FEED ADDITIVES
- VACCINES AND PHARMACEUTICALS
- DISEASE DIAGNOSIS
- DISEASE MANAGEMENT AND CONTROL
- ENVIRONMENTAL IMPACT ASSESSMENTS
- SUSTAINABLE AQUACULTURE

We provide expertise to help our clients

- enhance performance,
- improve efficiency,
- reduce costs,
- exploit new species,
- develop new operations,
- combat environmental impacts,
- improve stock health and behaviour,
- understand and mitigate the impacts of disease.

Our scientists are skilled at turning their research and experience into practical advice and solutions for farmers, managers, governments and policymakers alike.



Fish farmers & managers - improving stock performance and increasing production through innovation and reduction in losses

Exploiting species new to cultivation or an environment

- improving performance in intensive aquaculture operations for sole and scallops in Mediterranean waters
- researching the factors that affect stock vigour and performance: genetics, behaviour, and responses to environmental changes



Solving nutrition problems and reducing feed costs

- improving feed delivery and optimising diets
- enhancing feeding strategies using improved methods of feeding cultured organisms
- smart feeding systems for land based operations

Researching genetic composition to improve stock performance and fish health

- developing techniques to control sex for production of all female broods
- developing markers linked to increased resistance to disease to improve fish health
- developing markers linked to increased growth rate for improving the efficiency of production of cultured fish and shellfish

Reducing susceptibility to disease and the use of medicines through improved stress management

- understanding stress to improve welfare
- developing novel techniques to measure and quantify stress
- identifying the causes of stress and disease susceptibility
- improving juvenile quality by improving stress tolerance and reducing cannibalism
- improving welfare to reduce the impact of disease without medical interventions

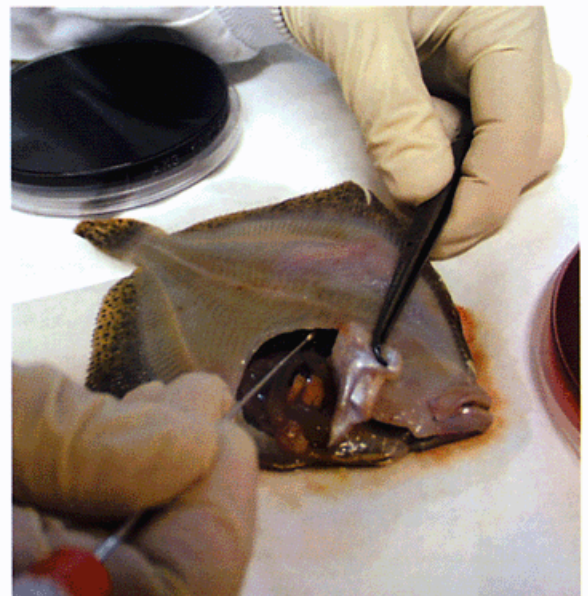
Diagnosis and investigation of disease in fish and shellfish

- diagnosis of unknown causes of disease
- health certification of imports and exports
- diagnosis of new and emerging diseases
- advice on issues concerning the transmission of disease from wild to farmed fish or vice-versa

Vaccine and pharmaceutical manufacturers - trials and data for licensing authority approvals

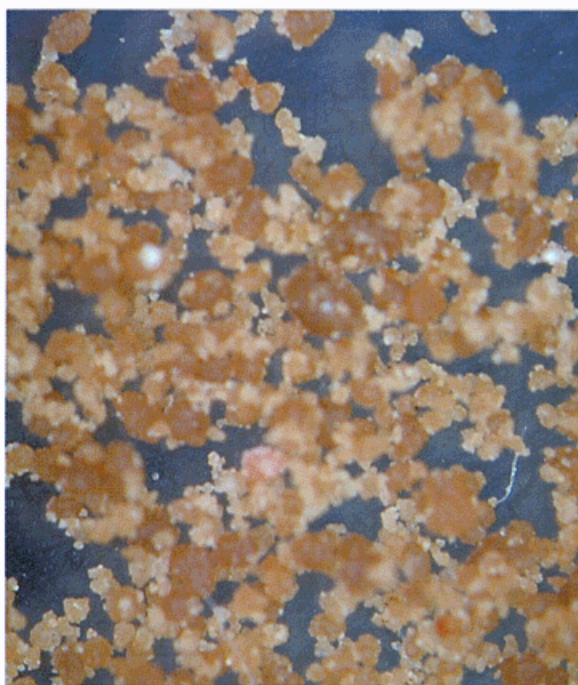
Studies and trials of vaccine and chemotherapeutant safety and efficacy

- assessments of therapeutants and vaccines against diseases from around the world
- intra-peritoneal, bath and co-habitant challenge protocols for a wide range of pathogens and fish species.
- safety and efficacy studies for vaccines to GLP, dose titration trials and pharmacokinetic studies for chemotherapeutants and disinfectants
- monitoring and evaluation of large scale field trials for data packages for licensing purposes.
- unrivalled experience of UK registration procedures, the demands of licensing authorities and related experimental requirements for antibiotics and other medicines
- environmental impact assessments of medicines and therapeutics
- veterinary medicine residue testing for compliance with International regulations



Fish feed manufacturers and additive companies - developing and testing new feeds and adding value to existing feeds

- developing and assessing the potential of feed additives to reduce the disease susceptibility of commercially farmed fish.
- safety and efficacy trials of additives with health benefits
- prebiotics, probiotics, immunostimulants, micronutrients and vitamins
- feeding trials using sophisticated or simple facilities
- improving feed preparation and delivery using formulated feeds



Policy makers and planners, governments - development of sustainable aquaculture through disease monitoring and assessment

Inspection and health certification

- advice on statutory inspection of fish and shellfish for notifiable diseases.
- health certification of imports and exports

Incidence and prevalence of disease

- advice on creating, implementing and managing regular programmes of field monitoring of farms and sites to assess the incidence, prevalence and significance of notifiable diseases
- contingency planning for disease outbreaks

Field monitoring management

- advice on development and application of flexible IT data management systems to efficiently implement field-monitoring programmes to comply with EU and other enforcement agency standards

Interpretation of legislation and regulations

- advice on drafting regulations and implementing them with control and enforcement measures
- advice on EU quality and safety import requirements for fish and shellfish data management systems

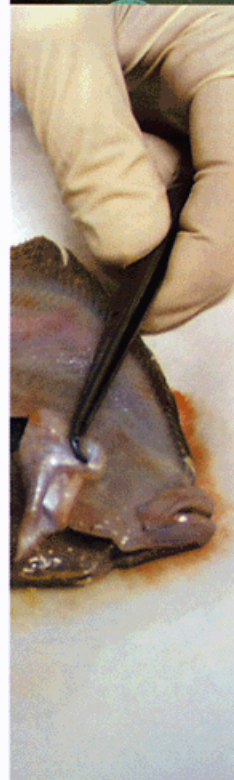
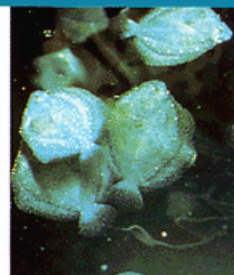
Environmental impacts assessments for aquaculture operations

Site selection and environmental impact prediction for new developments

- criteria for site selection, water sources, soil quality and properties
- detection and quantification of inorganic nutrients (N and P) - the primary source of hypernutrification and potentially eutrophication
- assessment of existing habitats and biological interactions within ecosystems
- potential impact of escaped farmed fish on the ecology of native fish populations and in terms of "genetic" pollution
- advice on issues concerning the transmission of disease from wild to farmed fish or vice-versa
- development and application of numerical models and integrated environmental information systems (e.g. GIS) to improve understanding and prediction of the impact of aquaculture developments on the coastal zone.
- assessment of public health issues arising from contamination of drinking water and consumption of aquaculture products including food poisoning micro-organisms, human enteric viruses, bacteria, algal toxins, organic and inorganic contaminants.
- advice on establishing regulatory framework for control of aquaculture operations

Assessing the environmental impacts of existing facilities

- measurement of organic contaminants in metabolic waste products (faeces, pseudo-faeces and excreta)
- assessments of habitat degradation and biological interactions
- monitoring nutrient status and water column quality
- detection and identification of toxic algal blooms, toxin identification
- benthos characterisation and ecotoxicological evaluation
- monitoring contamination from effluent or veterinary medicines
- monitoring compliance with regulations controlling discharges and planning requirements



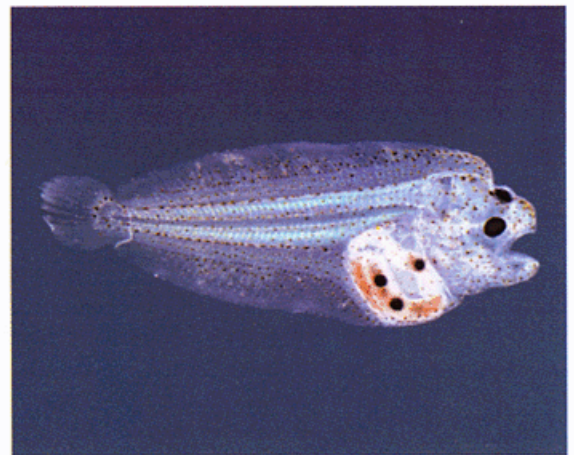


Skills and experience

CEFAS is a long-established research organisation with a thorough knowledge and skills base in fish cultivation, fish health and disease, fish stock assessment and fisheries management built up over the last 40 years. CEFAS offers its clients:

- Skilled specialist professionals with extensive expertise, worldwide experience, and international reputations.
- A reputation for quality with work carried out to exacting international standards.
- A dynamic and forward-looking approach to problem-solving - we support a programme of research to continually update our expertise. Recent projects have included investments in molecular biology, molecular genetics, feed additives, stress, welfare and the development of new immunoassay and analytical techniques.
- Practical, advisory and training expertise beyond the routine.

- A strong organisational infrastructure with well-equipped specialist laboratories, comprehensive IT facilities and controlled environment aquaria and fish rearing facilities accredited to GLP standards. We hold unique fisheries and environmental data archives, a world-leading marine science collection, and have experience in specialised IT application development for regulatory and research support - such as fisheries and ecosystem modelling software, data management systems, GIS and licensing systems.
- World-wide links within the aquaculture industry to create cost-effective consortia.
- A strong track record in delivering robust, high quality and authoritative work. We have delivered multi-million pound research, advisory and monitoring programmes for the UK Government for over 75 years. We have a more recent track record in undertaking short and long-term contract consultancies to fish farmers, feed manufacturers, chemical and pharmaceutical companies, the EU, and UK and international central and local Government Departments and enforcement bodies.



More information about CEFAS can be found on our website <http://www.cefas.co.uk>. Alternatively, to discuss your needs with one of our specialists please contact :