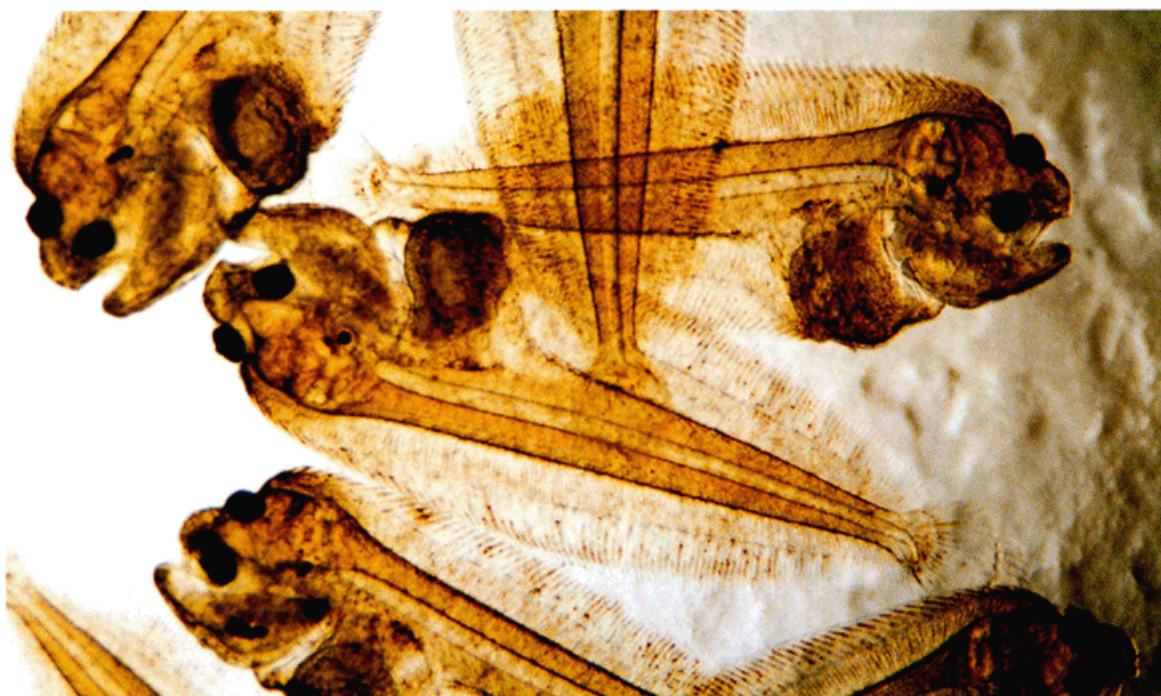


# *Finfish cultivation*

*Problems associated with juvenile production and subsequent performance currently limit the development of commercial farming of marine fish including species new to aquaculture, such as lemon sole, cod and Dover sole. CEFAS provides research and advice to help fish farmers and feed manufacturers find significant improvements in performance to enhance the economic viability of operations and enable new ventures to start up.*



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CONTROL OF REPRODUCTION

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FEED DEVELOPMENT AND EVALUATION

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GENETIC IMPROVEMENT AND SEX CONTROL

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DEVELOPMENT OF HATCHERY AND NURSERY TECHNIQUES

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QUALITY ASSESSMENT

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EVALUATION OF NEW SPECIES AND VENTURES

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COMPREHENSIVE ADVICE ON ALL ASPECTS OF FISH CULTIVATION

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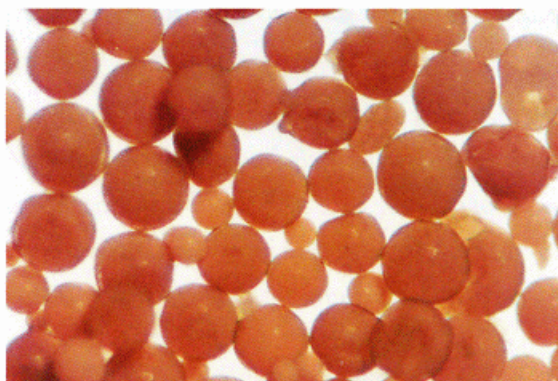
CEFAS experts in husbandry, nutrition, behaviour, endocrinology, pathology and genetics can advise on all aspects of fish quality, survival and growth to improve yields and reduce losses

- rearing of developmental stages
- feed composition and delivery
- sex manipulation and control
- disease susceptibility and resistance
- fish behaviour and conditioning
- stock management and welfare

## *Improving performance*

CEFAS is able to adopt a multidisciplinary approach working towards improved growth, survival, behavioural characteristics, stress tolerance, and disease susceptibility of species such as lemon sole, cod, Dover sole, turbot and halibut. We specialise in solving the especially difficult problems faced in rearing early developmental stages.

Our research into feed composition and feed delivery, sex control and understanding how the rearing and on-growing environment affects behaviour and survival has shown that improvements in performance are possible. We provide this expertise on a contract research or consultancy basis.



### *Feeds for rearing early development stages and for on-growing*

Formulated feeds are being developed to meet the specific nutritional requirements of all developmental stages to optimise health and growth.

We have expertise in:

- live food replacement diets
- specialised weaning and on-growing diets
- use of alternative protein sources
- microencapsulation of dietary supplements

### *Husbandry techniques for improved juvenile quality*

A better understanding of behaviour and rearing environment requirements is leading to improvements in juvenile quality such as improved stress tolerance, reduction in cannibalism, and better disease resistance, thereby increasing the prospects of success in both stock enhancement exercises and intensive culture operations.

We have expertise in:

- juvenile behaviour
- stress tolerance
- disease susceptibility
- feed delivery
- devising appropriate rearing conditions
- pre-conditioning

### *Improving stocks to achieve higher yields*

Growth suppression due to sexual maturity can be tackled by producing all female broods. Using expertise in genetics and endocrinology CEFAS is developing techniques to:

- control sex for production of all female broods
- manipulate spawning time
- improve disease resistance and other characteristics through the use of microsatellites

### *Stock management techniques for improving fish welfare*

Overcrowding can lead to stress, increase disease susceptibility, slow growth rates and detrimentally affect quality. CEFAS's expertise enables investigations into the measurement and identification of the causes of stress and disease susceptibility.

### *Successful track record*

CEFAS has over 30 years experience in:

- fin fish cultivation, hatchery and nursery techniques, including the development of innovative techniques for broodstock conditioning, larval and juvenile rearing and on-growing
- fish nutrition and physiology
- fish genetics

**We offer our clients impartial, reliable consultancy services based upon leading edge scientific expertise and comprehensive technical facilities. You are assured of the quality and integrity of our work.**

*For further information about any of our services or to discuss your needs with one of our specialists please contact*