

### “AFISA”

## An automated age-reading system for fish otoliths

*Most of Europe’s fish stocks are assessed using age-based models. However, the annual cost for the acquisition of fish age data, which are needed as inputs to these models, may amount to several million euros annually. In addition, the uncertainty surrounding the quality of these data has an impact on the precision and accuracy of age estimations for 75% of the stocks assessed by ICES and thus clearly influences the sustainability and socio-economics of the fisheries.*

Currently, fish age data are derived from otolith readings, or interpretations of “earstones”, which are small, calcified structures found in the head of all fish (other than sharks, rays and lampreys). These readings are being undertaken by human operators, and the tiny size of the otoliths makes the process of age estimation a complex, and therefore expensive, mix of pattern recognition and interpretation based on experience and knowledge.

In addition, the quality of fish age data still lacks, in most cases, standardisation, objective control and statistical evaluation. It is thus important that age estimation (or “age reading”) procedures in Europe are standardized.

In this context, an automated age-reading system would contribute to improving age estimation procedures and reduce costs of age-data acquisition. Although no such system is currently available, appropriate technology is readily accessible. The **AFISA** research project, which started in 2007, aims at **developing fully automated and robust systems for routine ageing using pattern recognition or statistical inference**. The whole processing chain from the acquisition of otolith data to the actual ageing

issue will be coped with.

To achieve its objective, AFISA will collate available otolith material and create databases of annotated otolith images. In a second phase, algorithms for the automation of fish age estimation from otolith features will be developed. These modules will then be implemented in a software platform dedicated to otolith imaging.

The developed systems will be evaluated for three species from several fish stocks:

- Cod from Faeroes, North Sea and North East Arctic
- Plaice from the eastern English Channel and Iceland
- Anchovy from the Bay of Biscay

For each of these species, the systems will be tested against quality-controlled sample data and a cost-benefit analysis will be undertaken for comparison against current costs.

**Age-based stock assessments are fundamental to the scientific advice underpinning the fish-stock conservation and management measures of the Common Fisheries Policy.** Any reduction in uncertainty affecting fish-stock assessments increases the accuracy of scientific advice and the confidence with which

**Project acronym:**

AFISA

**Full title of Project:**

Automated fish ageing.

**EU contract number:**

044132

**Web-site:**

<http://www.ifremer.fr/lasaa/anglais/aAFISA.htm>

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policy decisions can be taken. It is therefore hoped that the systems developed in AFISA will reduce the uncertainty in fish age estimations, while at the same time reducing the cost of the acquisition of age data. This way, the increased reliability of assessments and management measures will contribute to long-term sustainability of stocks and reduced socio-economic uncertainty.

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