

Presentation of MAR-ECO Students

Name: Birkir Bardson

Nationality: Icelandic



Institution: Marine Research Institute, Iceland

e-mail: birkir@hafro.is.

Degree: BSC in Biology, PhD student

Supervisor: Dr. Andrew Brierley, University of St Andrews, UK. <http://www.st-and.ac.uk>

Working title of project: An acoustic and net study of the distribution, abundance and ecology of myctophid fish species in the deep scattering layers of the northeast Atlantic.

Summary of project: In the North-East Atlantic, extensive deep scattering layers of varying intensities have been observed by echosounders throughout vast areas at depths between 0 and 800 m (Magnusson, 1996; Sigurdsson, et al., 2002). A great variety of pelagic organisms are found in these layers, but the major components are believed to be myctophids (Myctophidae), viperfish (*Chauliodus sloani*), jellyfish, cephalopods and euphausiids (Magnússon, 1996). The combined biomass of these organisms is believed to be very high (Magnusson, 1996), but has not been evaluated because neither the actual species composition in the layers nor their associated acoustic back scattering coefficients are known (Sigurdsson, et al., 2002). Stocks of the commercially important pelagic redfish (*Sebastes mentella*) in the Irminger Sea and adjacent waters have been estimated to have biomass of more than 2 million tonnes (Anon., 2002). This species interacts with the deep scattering layers, feeding on small fish such as myctophids and zooplankton. There is increasing interest in the fish species that make up the deep scattering layer in the Irminger Sea.

The main objective of this study will be investigation of ecological aspects of the abundance, distribution and trophic interactions of myctophids in the deep scattering layers.

Acoustic measurements and trawl catch data will be used to estimate species abundance and distribution. In recent years there has been much advancement in the use of echosounders and in the interpretation of acoustic data. Development in post processing of data has made it possible to draw more accurate conclusions on species composition from multi-frequency acoustic data e.g. dual- and multi-frequency methods (e.g. Watkins and Brierley, 1996; Demer, 1999; Korneliussen and Ona., 2002), from digital image processing of echograms (e.g. LeFeuvre et al, 2000) and other methods (e.g. Brierley et al, 2003).

Trophic interactions will be evaluated by comparison of stomach contents of the trawl-caught fish with available prey (as estimated from zooplankton net sampling and acoustic data).

At the Marine Research Institute (MRI) in Iceland, acoustic and biological data from several surveys (with *Sebastes mentella* as the target species) in the Irminger Sea over several years are preserved. In the last survey (June 2003) there were also additional investigations of zooplankton and small fish sampling from the deep scattering layers as part of MAR-ECO co work. The MRI has approved this project's access to these data. In addition, this study will solicit similar research data from other nations, it is e.g. known that a Norwegian research vessel (G.O. Sars) will be in the area of interest in the summer 2004, and collaboration between commercial fisheries will possibly be sought.

References:

Anon, 2002. Report of the planning group on redfish stocks ICES CM 2002/D:08, Ref. ACFM.

Brierley, A.S., Gull, S.F. and Wafy, M.H. 2003. A Bayesian maximum entropy reconstruction of stock distribution and inference of stock density from line-transect acoustic-survey data. ICES Journal of Marine Science, Vol.60: 446-452.

Demer, D.A. 1999. A multiple-frequency method for potentially improving the accuracy and precision of in situ target strength measurements. J. Acoust. Soc. Am. Vol.105(4): 2359-2376.

Korneliussen, R.J. Ona, E. 2002. An operational system for processing and visualizing multi-frequency acoustic data. ICES Journal of Marine Science. Vol.59: 293-313.

LeFeuvre, P. Rose, G.A. Gosine, R. Hale, R. Pearson, W. Khan, R. 2000. Acoustic species identification in the Northwest Atlantic using digital image processing. Fisheries Research. Vol.47: 137-147.

Magnusson, J. 1996. The deep scattering layers in the Irminger Sea. Journal of Fish Biology. Vol:49(Suppl. A):182-191.

Sigurdsson, Th., Jónsson, G., Pálsson, J. 2002. Deep scattering layer over Reykjanes Ridge and in the Irminger Sea. ICES CM. M:09.

Watkins, J.L. Brierley, A.S. 1996 A post-processing technique to remove background noise from echo integration data. ICES Journal of Marine Science. Vol.53: 339-344.