

**Monitoring gelatinous zooplankton: a cost-effective methodology during routine fishery trawl surveys**

**Authors:** Elvire Antajan<sup>1a</sup>, Sophie Pitois<sup>2</sup>, Lidia Yebra<sup>3</sup>, Luis Gil de Sola<sup>3</sup>, Franck Coppin<sup>1a</sup>, Christopher Lynam<sup>2</sup>, Arnaud Auber<sup>1a</sup>, Morgane Travers<sup>1b</sup>, Pascal Laffargue<sup>1c</sup>, Mathieu Doray<sup>1b</sup>, Angélique Jadaud<sup>1d</sup>, Tarek Hattab<sup>1d</sup>, Jérôme Baudrier<sup>1b</sup>, Sandrine Vaz<sup>1d</sup>

<sup>1</sup> French Research Institute for the Exploitation of the Sea (IFREMER), <sup>a</sup>Boulogne-sur-Mer, <sup>b</sup>Nantes, <sup>c</sup>Brest, <sup>d</sup>Sète, France

<sup>2</sup> Centre for Environment, Fisheries and Aquaculture Science (CEFAS), Lowestoft, UK

<sup>3</sup> Centro Oceanográfico de Málaga, Instituto Español de Oceanografía (IEO), Fuengirola, Spain

**Abstract**

Gelatinous zooplankton, including cnidarians, ctenophores, and tunicates (pyrosomes, salps and doliolids), are often overlooked by scientific studies, ecosystem assessments and at a management level. Despite the important economic consequences that they can have on human activities and on marine foodwebs, arguments often related to the costs of monitoring have resulted in the absence of relevant monitoring programs. A cost-effective protocol was developed and applied on trawling from existing fishery surveys conducted by CEFAS and IFREMER, covering an area spanning from the North Sea to the Mediterranean Sea. The trial phase has successfully demonstrated the adequacy of such a process to obtain relevant information on macro- and mega-zooplankton gelatinous organisms. This success has led to the acceptance of this protocol into the French implementation of the EU's Marine Strategy Framework Directive (MSFD). This protocol was also tested on the IEO MEDITS trawl survey data from 1994 to 2012. The advantages and limitations of the protocol will be discussed with a view to expand the integration of the protocol to other fisheries surveys.

**Keywords:**

Gelatinous zooplankton, cnidarians, ctenophores, tunicates (pyrosomes, salps and doliolids), Marine Strategy Framework Directive (MSFD).

**Contact author:**

Elvire Antajan. Ifremer.

<sup>1</sup> French Research Institute for the Exploitation of the Sea (IFREMER), <sup>a</sup>Boulogne-sur-Mer, <sup>b</sup>Nantes, <sup>c</sup>Brest, <sup>d</sup>Sète, France

<sup>2</sup> Centre for Environment, Fisheries and Aquaculture Science (CEFAS), Lowestoft, UK

<sup>3</sup> Centro Oceanográfico de Málaga, Instituto Español de Oceanografía (IEO), Fuengirola, Spain