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Elvire Antajan, zooplankton ecologist at IFREMER

Colophon

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The Nausicaa/ULCO-LOG cooperation within the MEMO-project



» National Sea Center of Nausicaa, Boulogne-sur-Mer (France).

The National Sea Center Nausicaa was created in 1991 and is located in Boulogne-sur-Mer. It is one of the most visited sites in the Nord Pas de Calais region with 13 million visitors since its opening. A total of 142 persons work at Nausicaa in its different services.

Nausicaa is a unique center to playfully and scientifically discover marine environments and ecosystems, in particular considering relations linking human to seas. It particularly aims to educate and raise public awareness to the protection and management of oceans and marine resources.

Within the MEMO-project, the cooperation between ULCO-LOG and Nausicaa started in autumn 2011. Nausicaa is being recognized for its ability to cultivate and maintain gelatinous plankton (e.g. jellyfish) and developing a collaboration dedicated to rear the invasive ctenophore *M. leidyi* was obvious. ULCO-LOG provides Nausicaa with new *M. leidyi* collected in the field and, in return, Nausicaa maintains the organisms in specific aquariums (kreisel tanks). Kreisel tanks are large cylindrical devices dedicated to jellyfish cultures. Seawater circulation inside the aquaria avoids



» *Mnemiopsis leidyi* exposed in Kreisel Tank, Nausicaa Sea Centre (Boulogne sur mer, France).

particles and organisms sedimentation and thus enhances their well-being (feeding, swimming behavior,...). Nausicaa succeeded in maintaining *M. leidyi* in a plankton kreisel for a rather long time (~1 year) thus allowing ULCO-LOG to use some of these organisms for specific laboratory experiments. Organisms were exposed to the public at Nausicaa, thus informing and educating visitors on invasive species using *M. leidyi* as an example of species introduction in the North Sea.

Steering committee meeting and modeling workshop in Wimereux (FR)

From the 3rd to the 5th of April all MEMO partners attended the steering committee meeting and modeling workshop at ULCO-LOG in Wimereux (FR). This was the last Steering Committee meeting before the final meeting in November (project ends December 2013). During the meeting, the planning as described in the project proposal and the progress within the three activities were discussed.

Activity 1: Distribution and population dynamics of *Mnemiopsis leidyi*

The performed sampling campaigns covered the whole 2 Seas area and resulted in data on the presence / absence and densities of *M. leidyi*. Also phyto- and zooplankton data were collected, and abiotic parameters such as temperature and salinity were measured. All data was summarised in a database and a habitat model was created. This resulted in maps which presented the distribution and potentially favourable habitats of *M. leidyi*. As joint scientific output, the observed densities of *M. leidyi* in the 2 Seas area were presented on the International Jellyfish Symposium in Hiroshima (5 to 7 June 2013; poster presentation).

Activity 2: Biology, physiology and feeding behaviour of *M. leidyi*

Initially there were some problems with the cultivation of *M. leidyi* for experiments. However, until now, some interesting results on the feeding ecology (stable isotope work) were obtained and presented. Upcoming experiments will involve the effect of variable abiotic factors (such as salinity and temperature) on respiration, food selectivity, reproduction and behavior of *M. leidyi*.

Activity 3: Socio-economic study on the impact of *M. leidyi* within the 2 Seas area

Questionnaires were developed and distributed among fishermen, divers and tourists to estimate their relation with jellyfish. Furthermore, newspaper articles on jellyfish were collected in a database. All these data will be analysed during the second half of 2013.

Sharing knowledge and communication

Apart from the presentations of the MEMO partners and discussions on the activities and management issues of the project, some external speakers were invited.

Starrlight Augustine (Mediterranean Institute of Oceanography, Marseille) discussed the dynamic



» MEMO meeting Wimereux, 3-5 April 2013.

energy budgets of ctenophores and cnidarians during the modeling workshop. She presented the DEB model and its parameters, and discussed its applications.

In the context of activity 2, Laurent Seuront (Flinders University, South Australia) discussed the impact of the presence of food, predators and chemicals on the movement behaviour of snails.

Séverine Ernest, national facilitator of the Interreg 2 Seas programme for France, presented the Interreg 2 Seas cluster initiative. This cluster initiative aims to valorise and disseminate the results of the existing Interreg projects and to facilitate cooperation on common objectives in a second phase.



Programme InterRegional - 2 seas MEMO *Mnemiopsis leidyi* Ecology and Modelling: Observation of an invasive comb-jelly

More info on: <http://wwwz.ifremer.fr/defimanche/Projets/En-cours/MEMO>



Photo: Frédéric Chevallier

Mnemiopsis leidyi is a planktonic gelatinous species, recently introduced on our coasts. This species can reach around ten cm in length. *Mnemiopsis* is a carnivore that consumes zooplankton including small crustaceans, mollusc larvae, fish eggs and larvae.

**If you observe this species,
send your record to
memo@ifremer.fr
Your help is needed!**

Send a message (with a digital picture) with this information:

LOCALISATION: (Name a/o geographic coordinates), coastal waters, offshore, harbour, ...)

ABUNDANCE: less than 10, 10-50, 50-100, 100-500, 500-1000, more than 1000

VERTICAL DISTRIBUTION: surface, bottom, whole water column

SIZE (CM): <2cm, 2-5 cm, 5-10 cm

OBSERVATIONS MADE WHILE: diving, swimming, fishing, ...



PP2: IFREMER

Created in 1984, the French Institute of research for exploitation of the sea (IFREMER), is a public institute of an industrial and commercial nature. It is supervised jointly by the Ministry of Higher Education and Research and the Ministry of Ecology, Sustainable Development and Energy.

IFREMER, through its research work and expert advice, contributes to the knowledge of the oceans and their resources, to the monitoring of marine and coastal environments and to the sustainable development of marine activities. To these ends, IFREMER conceives and operates tools for observation, experimentation and monitoring, and manages the oceanographic databases.

IFREMER employs about 1500 researchers, engineers, technicians and administrative personnel, which are divided in five centres covering all the French maritime facades: English Channel-North Sea, Brittany, Atlantic, Mediterranean, and Pacific.

Located in the first French fishing port at Boulogne-sur-Mer, the English Channel-North Sea centre draws its specificity of the economic importance of fishing and resulting activities. Its scope extends from Belgium to the Bay of the Mont Saint-Michel, spanning approximately 960 kilometres of coastline. It consists of 3 research laboratories:

- **The laboratory of fisheries resources**, improves the knowledge on the biology, ecology and dynamics of fish stocks. It is equipped with a cluster of sclerochronology which allows the study of the growth of fish from calcified pieces of the skeleton.
- **The laboratory of littoral environment and aquacultural resources**, whose missions are to monitor the networks of the marine environment quality monitoring and to conduct research on plankton dynamics, and is endowed with a cluster of Taxonomy and Ecology of Zooplankton (PTÉZoo).



» IFREMER, Boulogne-sur-mer.

- **The Hydrodynamics laboratory**, carries out research on submarine devices and new offshore concepts, and is in charge of a wave and current flume tank where fluid / structure interactions problems are tested under conditions closed to real ones.

IFREMER and MEMO

IFREMER participates in activity 1 of the MEMO-project consisting in the establishment of standardized protocols dedicated to sampling and conservation of gelatinous plankton for study purposes on morphology, genetics or experimentation on the living. From 2011 to 2013 IFREMER has conducted several sampling campaigns in the English Channel and the North Sea to study the seasonal distribution of

gelatinous plankton. IFREMER also organized a common sampling campaign, with the other partners of the project, covering the 2 Seas region on board his RV *Thalia* in October 2012. IFREMER also coordinates activities 2 and 3 of the MEMO-project. In activity 2 IFREMER collaborates with ULCO-LOG and ILVO for the implementation of experiments to study nutrition and reproduction of *M. leidy*, and determine the trophic role of *M. leidy* via isotopic analyses. In activity 3, IFREMER is working in collaboration with CEFAS to develop a planktonic ecosystem model, based on the combination of a hydrodynamic and biogeochemical model and a model based on the individual, focusing on the potential distribution of *M. leidy* in the 2 Seas region.

VARIA

Ostend, België, 20-22 November 2013

Conference 'Non-indigenous species in the North-East Atlantic'

Non-indigenous species are an important aspect within new coming regulations amongst them the MSFD-Marine Strategy Framework Directive. Many questions like "why do these species survive here as well?", "how do they get here?", "what is their impact and how do

we deal with it?" will be highlighted. Scientists and policymakers will be brought together to share knowledge and discuss on this.

Organisation by The Institute for Agricultural and Fisheries Research (ILVO), the Flanders Marine

Institute (Vliz), the Royal Belgian Institute of Natural Sciences (museum) and Ghent University.

For registration, further details and regularly updates on the conference see:
www.ilvo.vlaanderen.be/nisconference2013

Interview of the month: Elvire Antajan, zooplankton ecologist at IFREMER

Elvire, can you briefly introduce yourself and explain why you work on gelatinous plankton?

I work as a zooplankton ecologist at the French research Institute for the exploitation of the sea (IFREMER) in Boulogne-sur-Mer, where I currently coordinate the Pole of Zooplankton Taxonomy and Ecology. Since the beginning of my studies at the university I have always been fascinated by zooplankton, amazed by their forms and their very diverse coloring, and the way in which these small organisms interact with one another. It is a challenge to understand how the abundance and spatial distribution of these organisms are controlled. As PhD student, at the Free University of Brussels (VUB), I studied the effect of change in prey availability on the diet and egg production of copepods (small crustaceans). This led to postdoctoral studies at the Oceanographic Laboratory of Villefranche-sur-Mer in France, in which I worked on a new numerical method to analyse zooplankton samples than can help scientists to determine zooplankton abundance and distribution.

My interest in gelatinous plankton arose in 2009, when I had the surprise to collect huge amounts of the ctenophore *Mnemiopsis leidyi* with my planktonnet during a winter fishery survey in the North Sea. The same year, I made the first record of this alien species (originally native to the eastern coasts of America), in Dunkirk Harbour on the French North Sea coast. How significant is this new zooplankton predator on the ecosystem functioning, and what are the risks for human activities in our regions (tourism, fisheries, and industries using hydraulic cooling systems)? These are the new questions that I have been interested in since then.

What is your role within the MEMO-project?

I am involved in collecting and sorting of zooplankton samples along the French coasts of the eastern Channel as well as in the southern North Sea. This will allow the definition of spatial and temporal distribution of *M. leidyi* and of its potential prey in the 2 Seas region. I also coordinate the MEMO activity 2 on physiological and ecological characteristics of *Mnemiopsis leidyi*. Finally, together with all MEMO partners, I work on the development and the testing of the Standard Operating Protocols (SOPs) for sampling and preserving gelatinous plankton for morphological, genetic studies and experimentation on live specimen.



» Elvire Antajan, zooplankton ecologist at the French research Institute for the exploitation of the sea (IFREMER) in Boulogne-sur-Mer.

What results do you expect within the MEMO-project?

Our investigations already show that the spreading of *M. leidyi* is more extensive than expected, since the species is present from the Bay of Seine on the French coast of the English Channel to the Zeeland waters of the North Sea (but not present on the English coasts). In some monitoring stations

M. leidyi densities are also comparable with that in other coastal native and invaded areas (max. 177 ind. / m³ in the Eastern Scheldt estuary). The end of the project should give us more information on the habitat preference of *M. leidyi*, its predation pressure on zooplankton assemblages and hopefully, on migration patterns of *M. leidyi* in and out the 2 Seas region.