

Scientist in Residence Report

Mauricio Ferreira

Main project – Plankton observations in the Irish Sea



Knowing that we would cross the Irish Sea made me wonder about what differences I would encounter between the English and Irish coastlines. I chose to look at the different planktons we could find allowing the trainees to be more involved with what the planktons represent in the ecosystem, the differences between them and what areas have a higher density / how the beaches around those areas look like.

Planktons were known to some of the trainees on board, but none had ever seen one before. This experience allowed them to see how they look through a microscope, and understand the importance of these creatures. Primary and secondary producers, plankton can also be classified as phytoplankton and zooplankton, and are the base of the food chain in most marine ecosystems. The beauty of such a food chain is that those tiny organisms help to sustain the life of

much bigger animals, such as the Blue whale.

Methods

A plankton net with 100 μm with 26 cm of diameter was used for sampling six sites in which the boat was either anchored or moored. The plankton net was lowered to 4.5 m and raised outside of the water until all the water was filtered. The process was done three times at each site. Since the boat was not moving at the sampling moments, it collected around 720 litres of seawater per sample. The samples were then observed through a microscope.

The whole process was done by the available trainees whilst I was supervising. They were instructed about the whole process and the importance that a correct and patronised sampling has on the results.

The identification was done by morpho species. The study has the aim to spread awareness and make the trainees interested in science. For many, this was the first time operating a microscope, and therefore identifying to a species level was not necessary for the project.





Results

Table 1 – Phytoplankton shapes found in each site.

Site	Cushion shaped	Centric	Chain without setae	Chain with setae	Spiral chain	Needle shaped	Diamond shaped	Straw shaped	Banana shaped
Ramsey	x	x		x		x			
Douglas	x	x		x					
Dun Laoghaire	x	x	x	x	x	x	x		
Fishguard	x	x		x		x		x	x
Skerries	x	x		x	x	x	x	x	
Dublin	x	x	x	x	x		x		

Table 2 – Planktonic stages found in each site.

Site	Brittle star	Nauplius stages	Bivalve	Polychaete	Snail	Bryozoan
Ramsey		x	x	x		
Douglas		x	x	x	x	x
Dun Laoghaire	x	x	x	x		x
Fishguard		x		x		
Skerries		x	x	x	x	
Dublin	x	x	x	x		

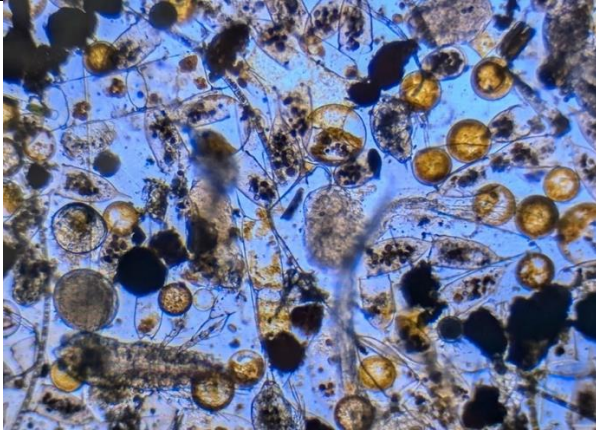
Table 3 – Types of zooplanktons found in each site.

Site	Copepod	Ceratium tripos	Ceratium fusus	Ceratium furca	Radiolarians	Tintinnids
Ramsey	x	x			x	
Douglas	x	x				
Dun Laoghaire	x	x	x	x	x	
Fishguard	x	x				
Skerries	x	x	x	x	x	x
Dublin	x	x	x	x	x	x



**SEAS
YOUR
FUTURE**

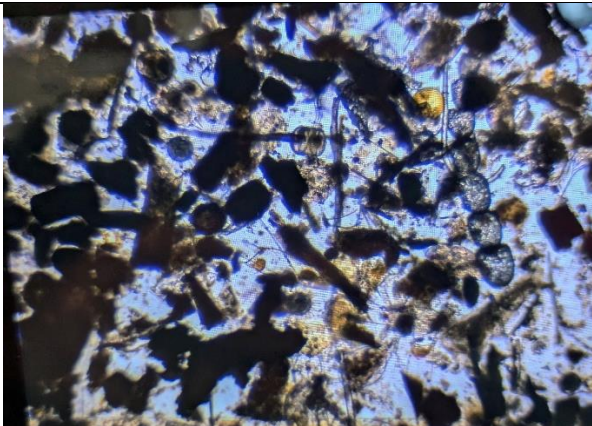
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Sample from Dublin containing high abundance of centric diatoms (the yellow circular objects).



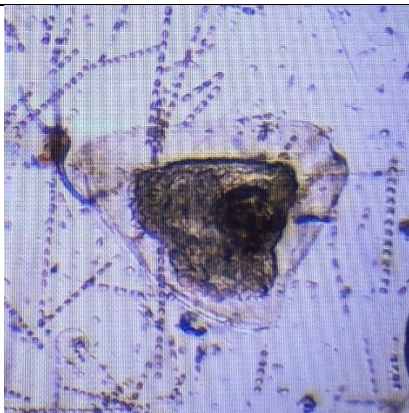
Sample from Ramsey, there was a dominance of chain diatoms (the multiple lines).



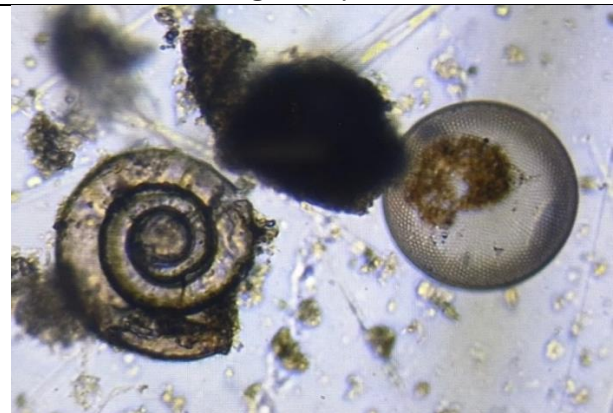
Sample from Skerries, which had a lot of organic detritus not allowing the proper observation.



A chain diatom with setae. Chain diatoms is a good choice to observe cell division too, since sometimes you can spot cells phasing through the process.



A planktonic stage of a bryozoan.



A seasnail (left) and a centric diatom (right).



**SEAS
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A dinoflagellate, *Ceratium tripos* (on top), which in large quantities can cause harmful blooms. And a spiral diatom chain (below).



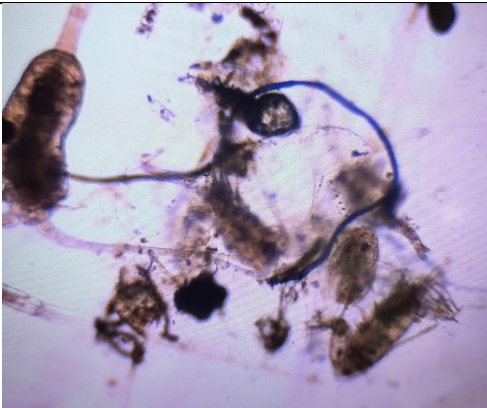
A dinoflagellate from the genus *Proteperidinium*.



A planktonic stage of brittle stars.



Two radiolarians.



A microplastic (in blue), it was found in every sample taken, the place where it was found the most amount of them was Skerries and the place with least was Fishguards. They are formed from larger plastics with break away over time, being this small means that they enter the food chain, and the higher trophic the animals is the more microplastics it contains, this happens by accumulation in the food chain.



A copepod (right) and a nauplius larval stage (left) which can grow to become a crab, lobster, barnacle, copepods and others. Very difficult to distinguish them at this stage.



The voyages

Since this was my first time on a sailing boat, I had to be open-minded about the limitations of the project and what I could do. It took a few days to start understanding how I could develop the research project and integrate the trainees into that. There were many changes of destinations and timings; therefore the rigidity of collecting the patronised sample might not be possible.

Ramsey – we were anchored and this was my first attempt to talk about plankton to everyone on board, allowing the trainees to collect the sample engaged and made them more interested to look at the microscope. It was found a small amount of each of the planktonic groups and the plankton net was visible until the end of the rope holding it (which was a link to explaining all the different water visibilities) and what was the meaning of having water columns that were still visible at 4.5m depth. The presence of bivalves on the sample opened a question if we would find shells at the beach, which was confirmed later once we all got the rib to go ashore. This allowed another conversation about the importance of the benthic filter feeders that help to maintain good water quality.

Douglas – the boat was at the docks, and that developed a chat about how the samples might be very different since we are much closer to the beach at a shallower water column than at Ramsey. The sample had a slightly higher diversity and density of planktons, and also had the maximum water visibility. Once again the beach had many shells and that was observed by some trainees after being at Douglas for a few days.

Dun Laoghaire – once again the boat was at the docks. At this point the research was done myself since the trainees departed. The sample contained the most density of phytoplankton observed. At the same time, it was observed there was a higher diversity at the beach with more shells, birds and even seals. The water visibility wasn't more than 2 meters.

Fishguard – the boat was anchored, and we had a quick opportunity to be ashore since it was raining a lot. It was the opportunity to speak with the second trainee group. A lower diversity was seen on the sample, and that was represented by a lower diversity at the beach too. Lower water visibility was observed when lowering the plankton net, also reaching a maximum of 2 meters and hypotheses were created before the sample was analysed through the microscope. Once through the microscope, a large quantity of sand was observed which might be the answer for low visibility.

Skerries – another sample collected when the boat was anchored, but this time the plankton net wasn't visible after 0.5 meters. That was the result of a large amount of detritus in the water which wasn't able to be identified. The sample contained a lot of plankton, however the unidentified organic material made it difficult to make any observations on this sample.

Dublin – the final stop for the voyage, the boat was close to the city centre docks. Even lower visibility was observed, around 0.2 meters and a green colouration to the water. A predominant presence of centric diatoms was observed which hadn't been seen before, along with some different chain phytoplankton of strong green colour. The sample however did not contain much organic detritus like Skerries, which might imply that the water may be cleaner even though it was less transparent.

In general, it was interesting to observe the differences between locations such as spiral chain diatoms, and some others were only observed on the Irish side, and that a higher presence of plankton also contained a higher amount of shells at the beach. In specific Dun Laoghaire, had the highest diversity and density of plankton, it was also observed the highest diversity of animals at the beach.