

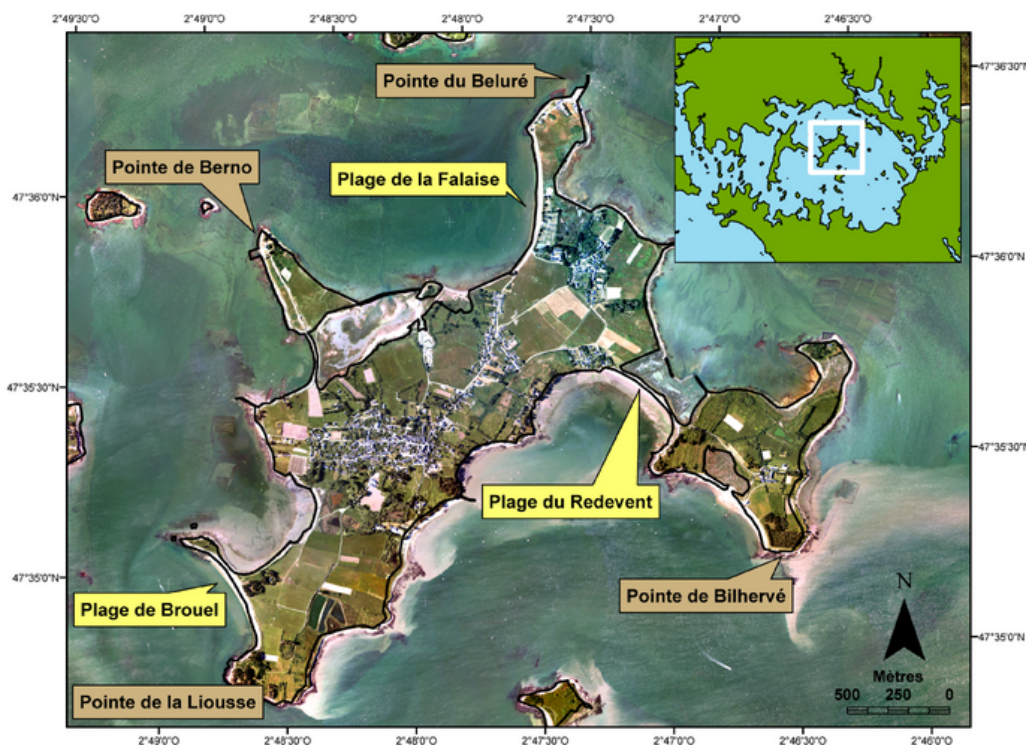
A Muddy Situation Is A Magical Situation

by Jenny Gil



The 1st beach visited in the Field trip was the Plage de la Falaise.

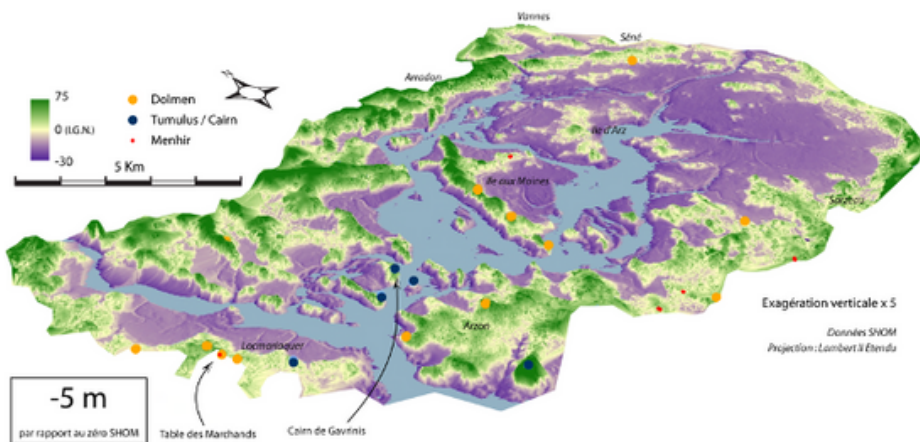
Have you ever been in a muddy situation? I have, and it was a Magical situation. I refer to the first muddy coast I visited, in the Île-d'Arz island. We visited Île-d'Arz island on the 1st field trip, part of the IRES Program: Multidisciplinary Coastal Zone Hazards, which we visited with professors and students from University Bretagne Sud. Surprisingly, the muddy coast was beautiful and had different colors, especially green and orange. These multicolors are due to all the macro and microalgae and other organisms that give out the color in the mud.



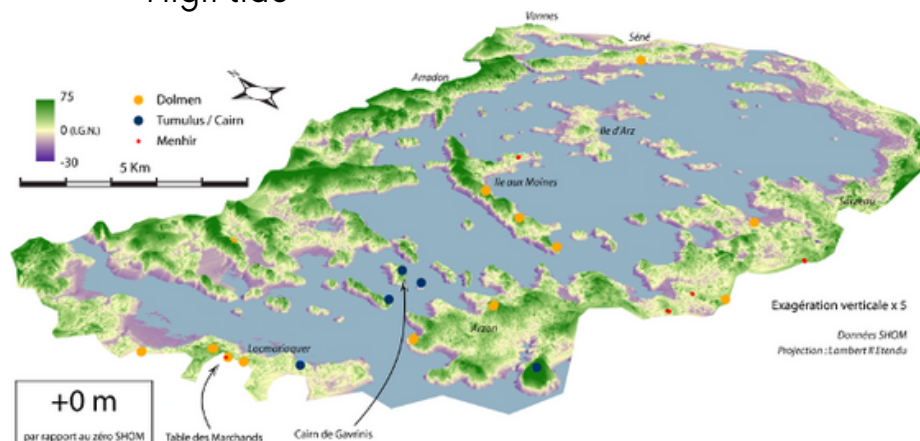
Map of the Île-d'Arz island.

From where I am from, Puerto Rico in the Caribbean, we do not have such muddy coasts; we have sandy coasts. I was so surprised because it was nothing like I had seen before. Muddy coasts are caused by product by the accumulation of fine sediment and often limited wave exposure. This muddy coast was also due to the powerful tidal currents, meaning a drastic low and high tide (Marcos et al., 1996); these dominated environments are called hypersynchronous (Dalry & Choi, 2006) The examples of this powerful tide currents and hypersynchronous can be seen in figure 2. This "muddy situation" is also because the medial sub-basin channel beds are mainly composed of sand and silt, which changes to mud in the more lateral channels.

Low tide



High tide



Let's Protect the Mud!



Even though one may feel uncomfortable walking in this mudflat, mudflats are vital in preventing coastal erosion. Keeping this mudflat healthy is healthy for the ecosystem; they are a natural buffer zone. It is also a habitat for many organisms like microalgae (diatoms, green algae, and cyanobacteria) and macroalgae, which I will soon discuss. Sadly, the mudflats are dangerous due to anthropogenic factors such as building near shore, rising sea levels, scouring for shipping purposes, and chemical pollution. We must protect this muddy environment by educating others about the magical muddy coast. During this blog, you will also learn about the biodiversity of algae that lives in these environments.

Rainbow of Macroalgae

The moist, muddy coast makes it the perfect region for various algae to grow. The second side we visited during the field trip was Brovel Beach during low tide, which showcased a rainbow of macroalgae from **Green algae for example, Sea Lettuce** to **Brown Algae example, Bladderwrack** to **Red Algae, for example, Irish Moss** that can be seen in the picture above. Macroalgae are photosynthetic organisms that live in seawater or freshwater. There are three types of macroalgae: Rhodophyta (red), Phaeophyta (brown), and Chlorophyta (green) macroalgae. During the field trip, I was able to collect macroalgae for all of the types.



Green Algae

Ulva sp. (Sea Lettuce)

Red Algae

Chondrus crispus (Irish Moss)

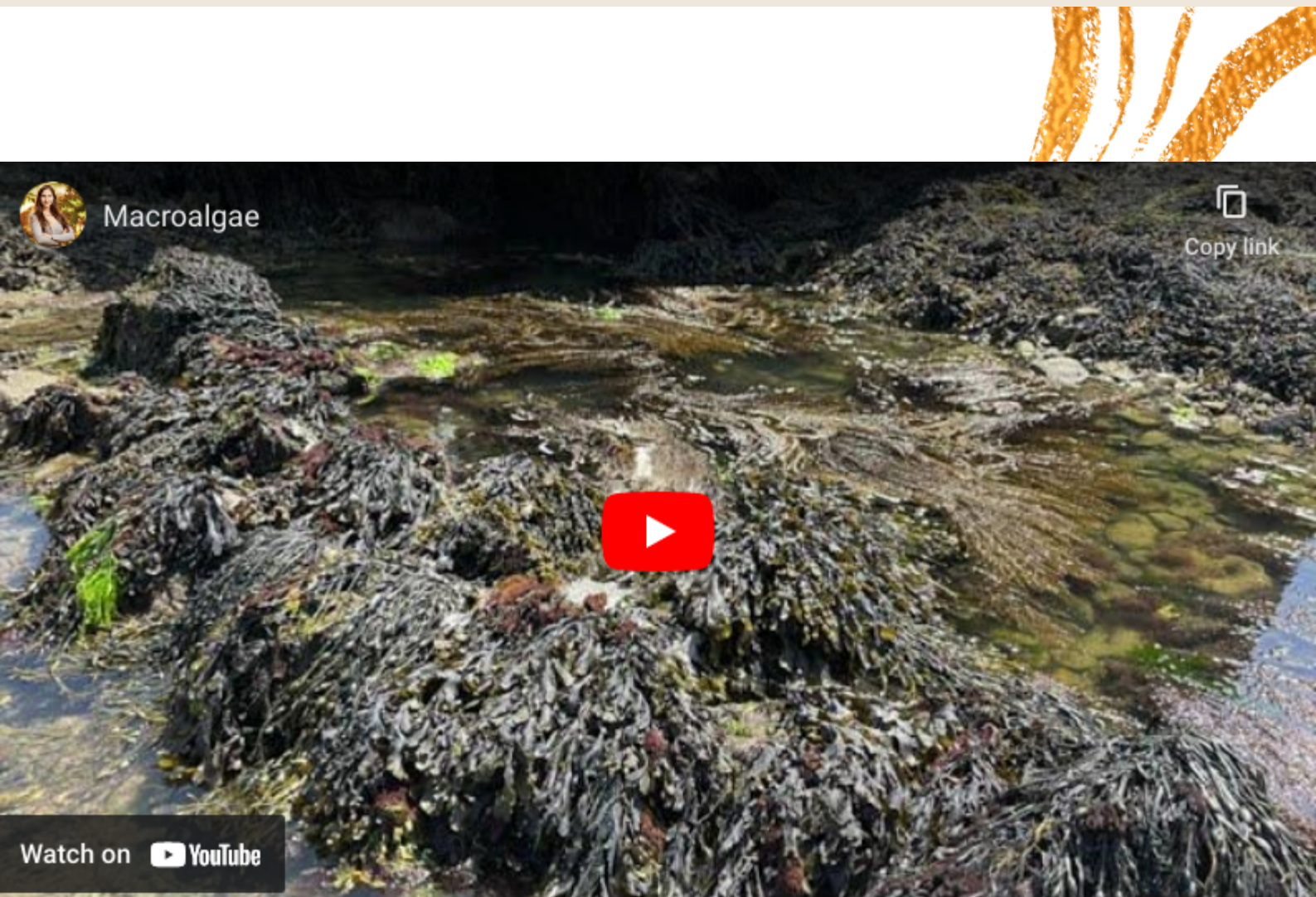
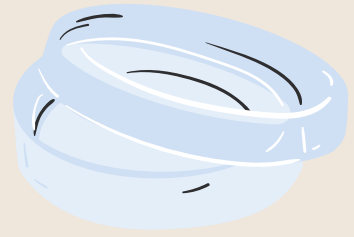
Brown Algae

Fucus vesiculosus (Bladderwrack)

Macroalgae in the lab

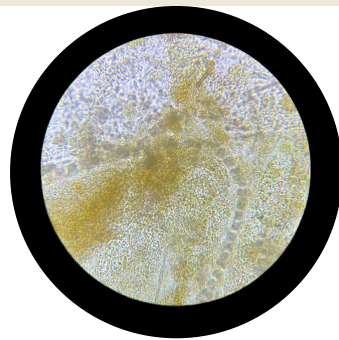
During the field trip, I took pictures of the microalgae I saw, collected some, and stored them in the flask tube. Once it arrives in the lab, use a tray or dish and add some filter saltwater and the macroalgae samples.

Like this video shows:

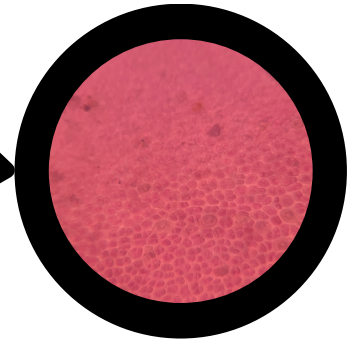


Under the microscope

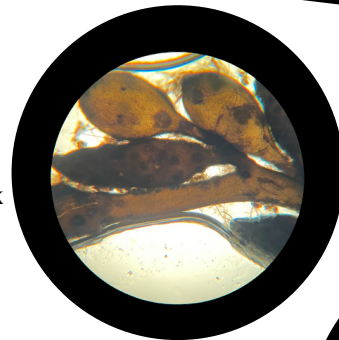
After this, the macroalgae samples were also put under the EM microscope(<https://www.em-microscope.com/>) for an even closer look



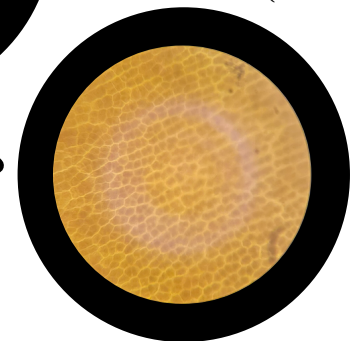
Ceramium botryocarpum 60x



Chondrus crispus
(Irish Moss)60x



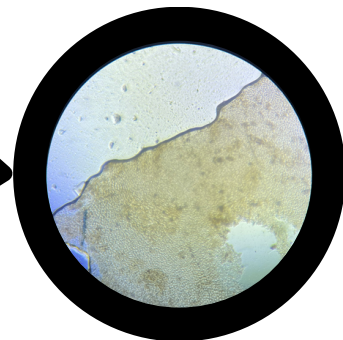
Halydris silicosa 40x



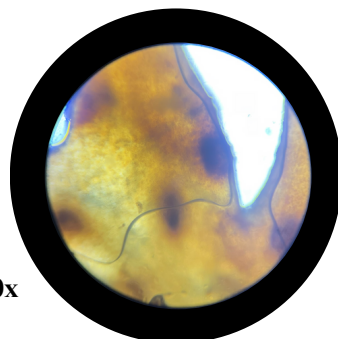
Pylaiella littoralis 60x



Ascophyllum nodosum
60x

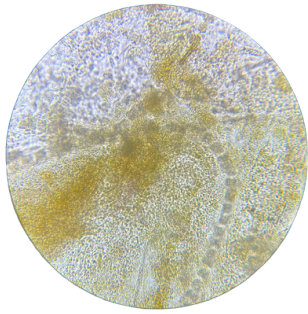


Porphyra purpurea (Nori) 10x

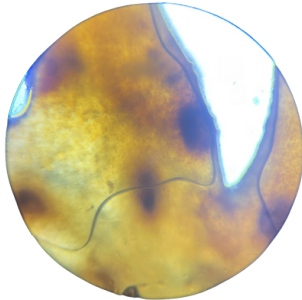


Cystoseira 10x

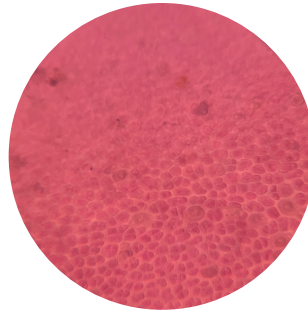
Identifying Macroalgae



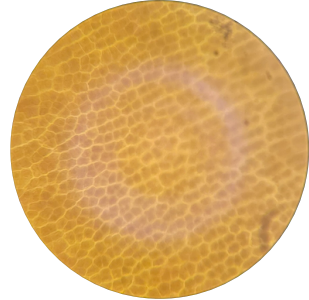
Ceramium botryocarpum 60x



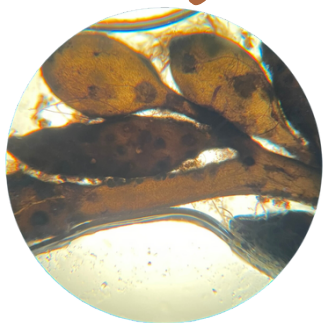
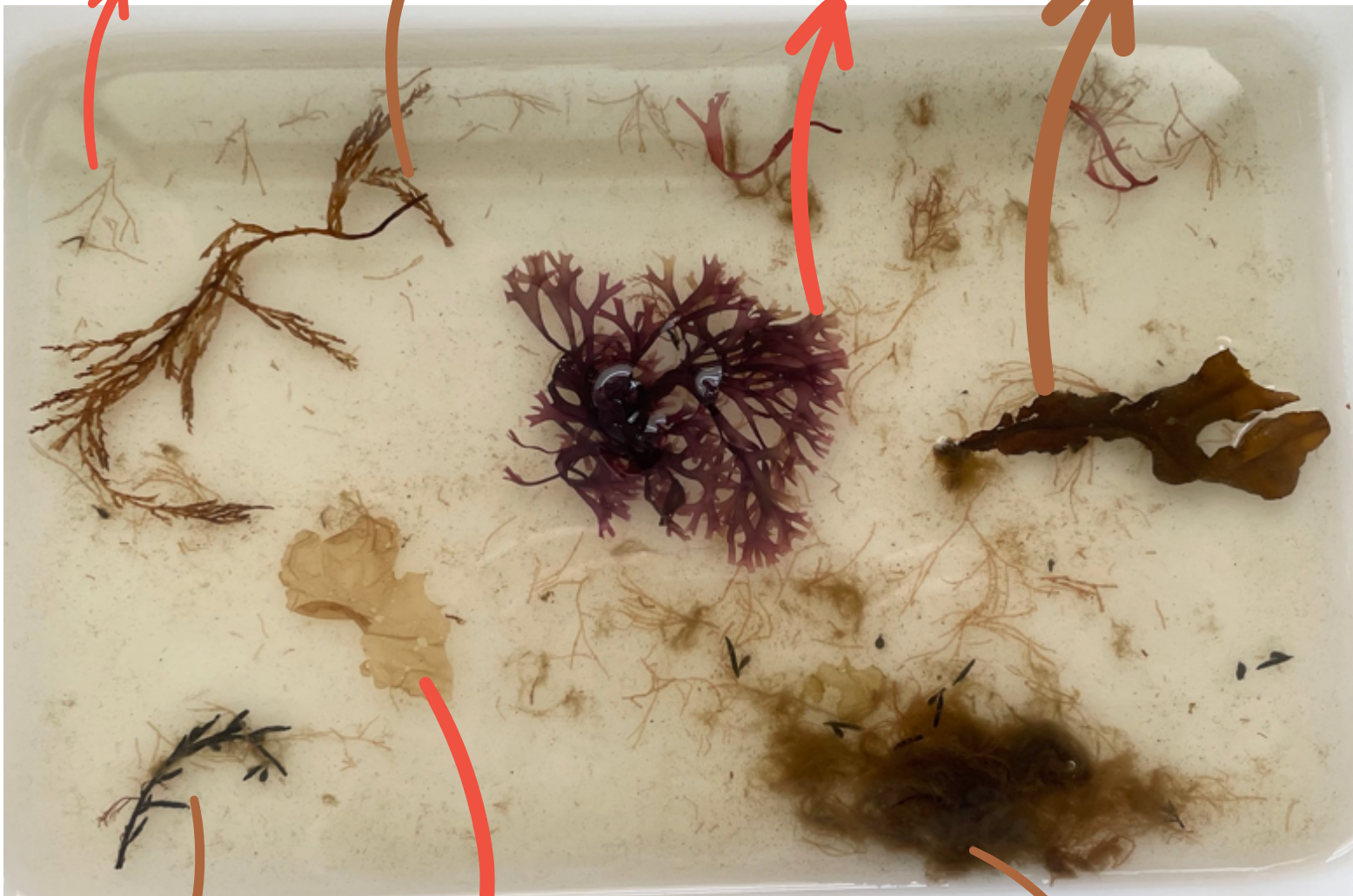
Cystoseira 10x



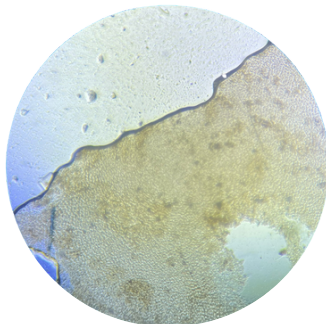
Chondrus crispus
(Irish Moss) 60x



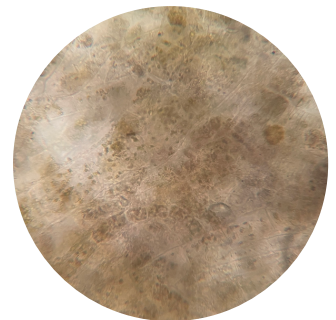
Ascophyllum nodosum 60x



Halydris silicosa 40x



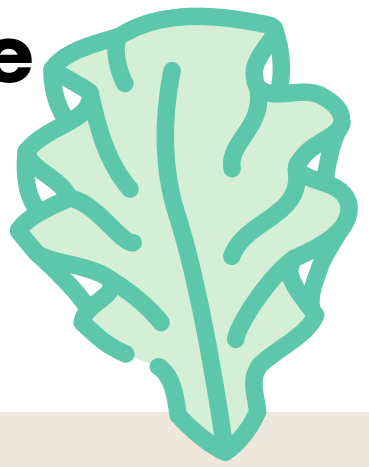
Porphyra purpurea (Nori) 10x



Pyloiella littoralis 60x

Type of Macroalgae

Chlorophyta (Green Algae)



Ulva sp.

An edible alga whose common name is the sea lettuce. This alga is very nutritious since 10g of dried algae provides us with more than 70% of magnesium and more than half of iron, protein, calcium, iodine, and vitamin B12. It is significantly profits on the coast of Brittany, France due to the high level of nitrates from the intensive farming there, which washes out to sea. Washed up on beaches, their decay produces methane, hydrogen sulfide, and other gases (Ménèsguen, A., & Piriou, J. Y. 1995). Watch this video to see us try Ulva in the field:



Eating Sea Lettuce!



Copy link

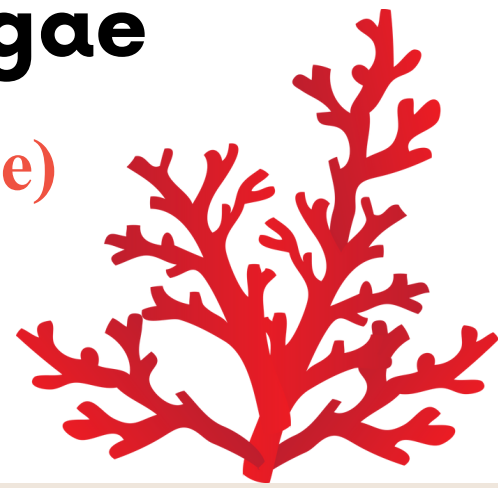


Watch on  YouTube

Type of Macroalgae

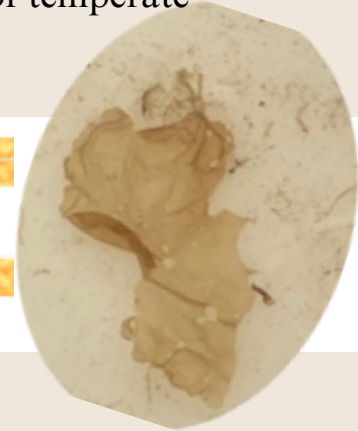
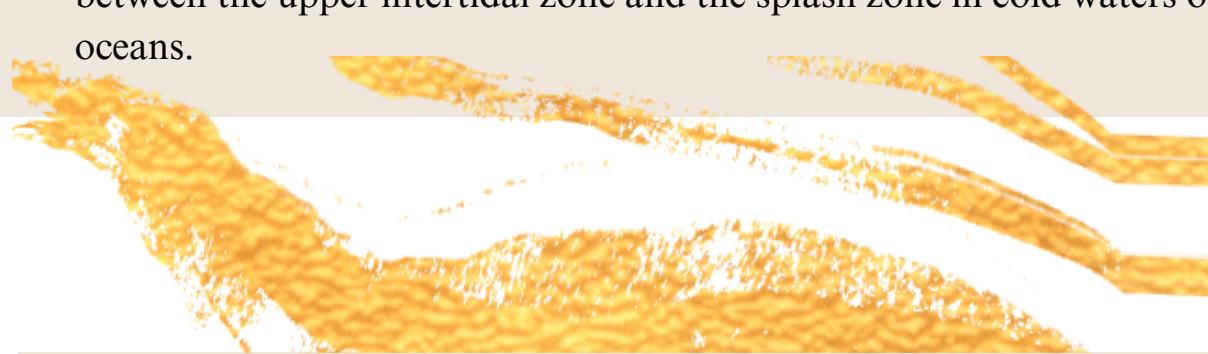


Rhodophyta (Red Algae)



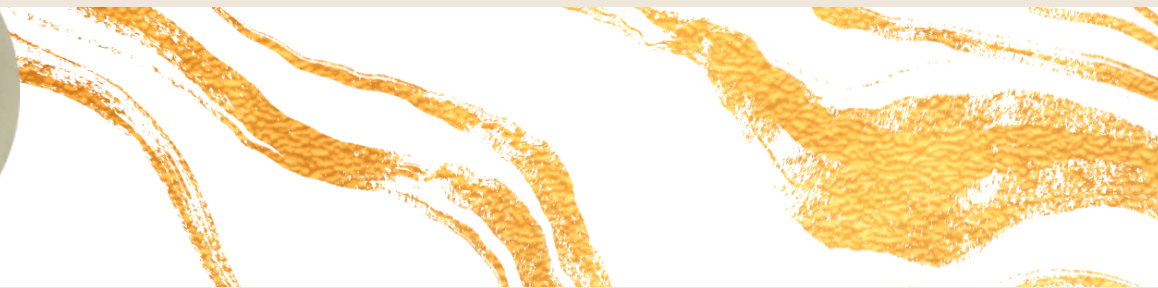
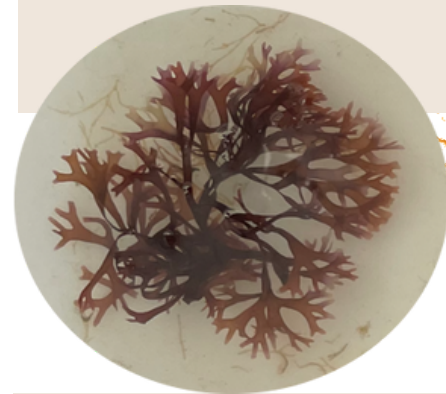
Porphyra purpurea (Nori)

An edible alga with its common name **Nori**. It grows in the intertidal zone, typically between the upper intertidal zone and the splash zone in cold waters of temperate oceans.



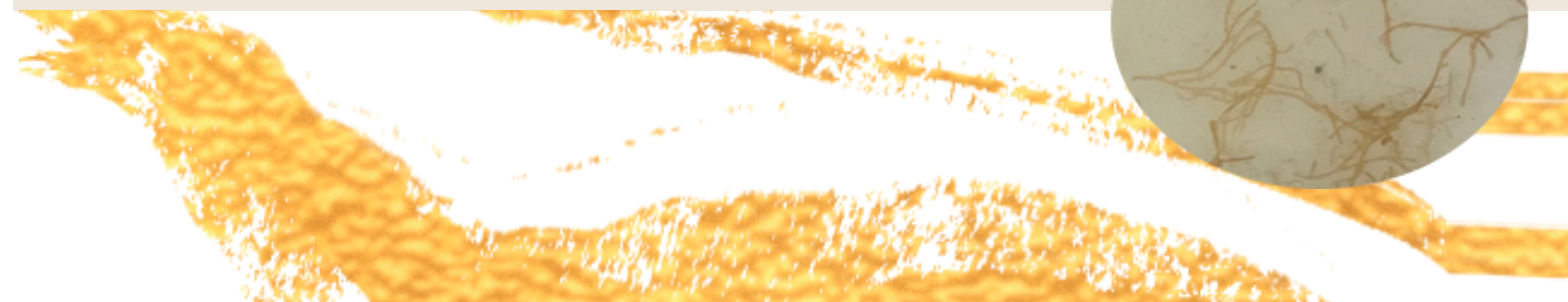
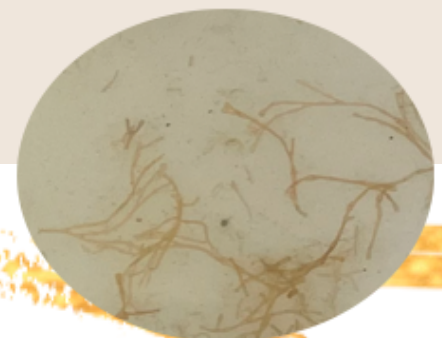
Chondrus crispus (Irish Moss)

Its common name is the **Irish moss**, and it is used for food due to its high polysaccharide carrageenan, which constitutes 55% of its dry weight.



Ceramium botryocarpum

is a tiny filamentous alga, and its axes are covered by small cells that form a complete cortex over the filaments.

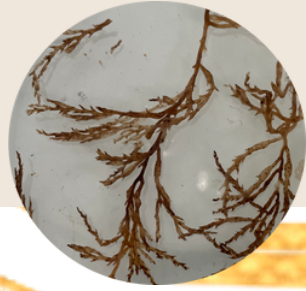


Type of Macroalgae

Phaeophyta (Brown Algae)

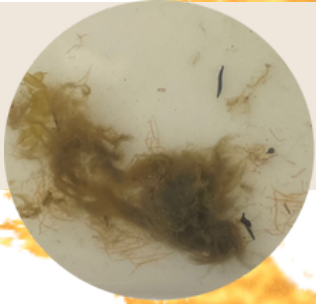
Cystoseira sp.

Is of the order Fucale's. Many algae around this region are of order Fucale. They have pneumatocysts (air vesicles). The air vesicles keep the algae erect, causing it to float in strong currents.



Pylaiella littoralis

An uniseriate filament alga without a terminal true hair.



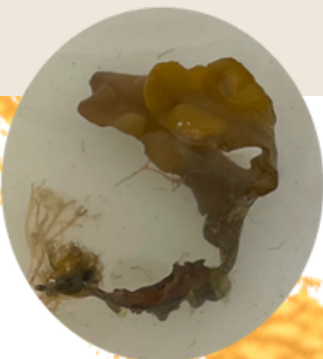
Halydris silicosa

This is also known as Sea oak. It contains small air vesicles which cause them to float.



Ascophyllum nodosum

They are common large cold-water algae. They have long, challenging, and leathery fronds and egg-shaped air bladders.



The Invisible World



In this muddy environment, there are invisible organisms called microalgae. Microalgae are algae of microscope size; you need a microscope to observe them. It would be best to have a pipette and a container to collect microalgae in this environment. In this video, you can observe how the microalgae were collected in Brovel Beach.

After collecting microalgae in the field, the samples were taken to the lab to be observed under the microscope. To observe the algae samples, you filtered the sample liquid and then the pippette. After this prepare them in a slide and are ready to be observed under the microscope.



Diatoms

The microalgae observed were all diatoms!

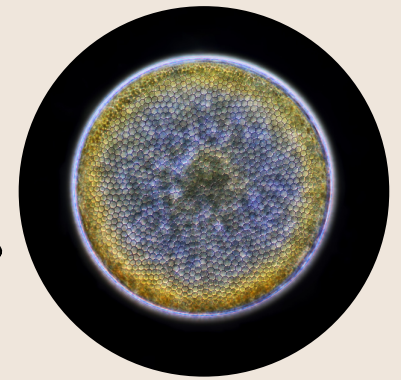


Diatoms are microalgae enclosed within a siliceous cell wall called a frustule.

They have two shapes:

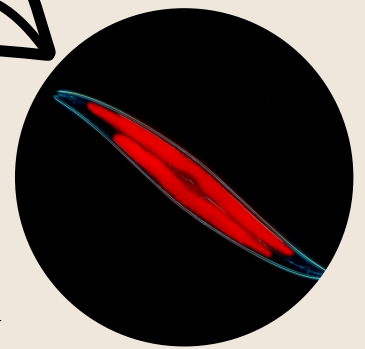
1- Centric Diatoms

Radially symmetric and round-circular



2-Pennate Diatoms

Broadly bilaterally symmetric (it can be split in two)



Diatoms are unicellular organisms observed in solitary cells or colonies shaped like ribbons, fans, zigzags, or stars. Individual cells range in size from 2 to 200 micrometers, and a microscope is needed to be seen. (Hasle et al. 1996)



Types of Diatoms

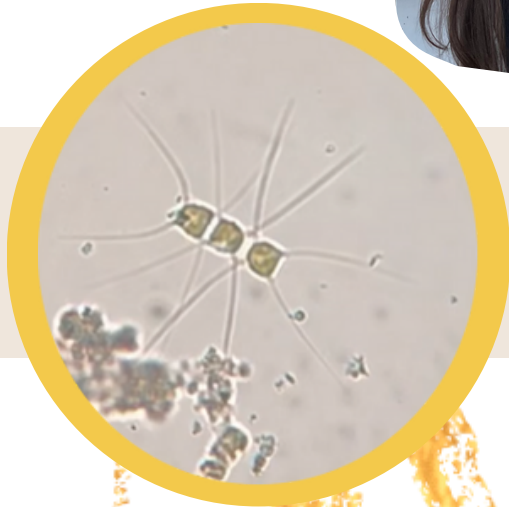
Licmophora sp.

These are pennate diatoms found in marine and freshwater environments.



Chaetoceros sp.

The duration of linear colonial growth habit and long, overlapping spines are thought to minimize sinking rates.



Dipoloneis sp.

Are diatom with elliptic to panduriform shape, with bluntly rounded apices.



Now you know that a muddy coast is magically full of microscopic organisms, especially diatoms.

Too Much Algae

Algae are critical for keeping up with the health of the mudflat, which is a natural buffer zone. Too much algae is also a problem as we learn about Ulva bloom on the coast of Brittany.



Next Time...

Next time you are in a muddy situation and think you are stuck, think about the muddy coast and understand that sometimes muddy situations can be magical ones full of organisms and help protect our coasts.

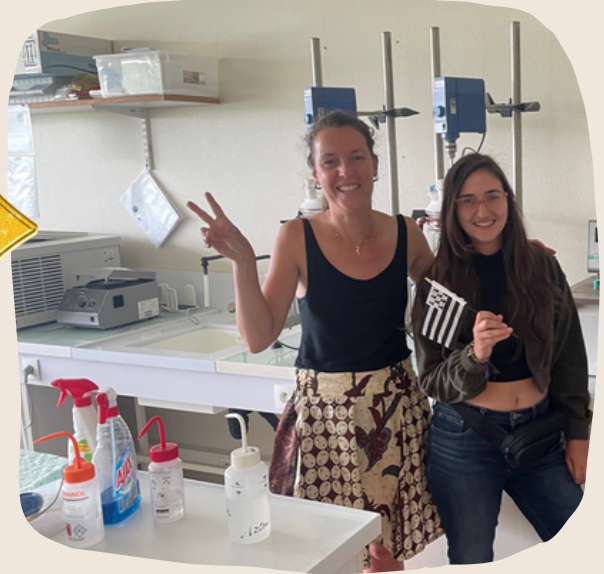


Acknowledgment

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For all of the ASI Fellow

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